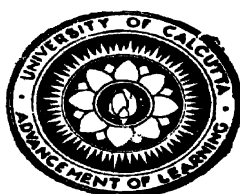




UNIVERSITY OF CALCUTTA  
REGULATIONS

*WITH AMENDMENTS UP TO  
31st JULY, 1955.*



UNIVERSITY OF CALCUTTA  
1955



PRINTED IN INDIA

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## CONTENTS

	Page
<b>I. ACT OF INCORPORATION and OTHER ACTS</b>	
Act of Incorporation (Act No. II of 1857) .. ..	vii
The Indian Universities Act, 1904 (Act No. VIII of 1904) ..	xiv
Validating Act (Act No. II of 1905) .. ..	xxxii
Act No. XI of 1911 .. ..	xxxiv
Act No. VII of 1921 .. ..	xxxv
First Schedule (Sec. 5 of Indian Universities Act, 1904) ..	xxxvi
Government of India Notification under Sub-section (1), Sec. 124 of the Government of India Act, 1935 .. ..	xxxviii
<b>II. NEW REGULATIONS</b>	
CHAPTER I. The Senate .. ..	1
" II. Vacancies on the Senate .. ..	12
" III. The Faculties .. ..	14
" IV. The Syndicate .. ..	18
" V. Boards of Studies .. ..	22
" VI. University Finance Committee .. ..	25
" VII. The Registrar and other University Officers .. ..	28
" VIII. Inspector of Colleges .. ..	32
" IX. University Professors .. ..	33
" X. Special University Readers .. ..	35
" XI. University Teachers .. ..	36
" XI-A. Post-Graduate Teaching in Medical Science .. ..	60
" XII. Election of Fellows by Faculties .. ..	74
" XIII. Election of Fellows by Graduates .. ..	76
" XIV. Register of Graduates .. ..	78
" XV. Register of University Students .. ..	80
" XVI. Non-Collegiate Students .. ..	82
" XVII. Female Candidates .. ..	84
" XVIII. Affiliation and Disaffiliation of Colleges .. ..	85
" XIX. Conditions to be fulfilled by Colleges affiliated under Act II of 1857 .. ..	89
" XX. Inspection of Affiliated Colleges .. ..	92
" XXI. Recognition of Schools and withdrawal thereof .. ..	94
" XXII. Conditions to be fulfilled by Schools now recognised .. ..	100
" XXIII. Admission, Transfer and Withdrawal of Students .. ..	104
" XXIV. Residence of Students .. ..	110
" XXV. Examinations .. ..	115
" XXVI. Conditions of Study in Affiliated Colleges .. ..	128
" XXVII. Conditions to be fulfilled by Colleges affiliated in Science .. ..	133
" XXVIII. University Library .. ..	137
" XXIX. Transitory Regulations .. ..	139
" XXX. Matriculation Examination .. ..	146
" XXXI. Intermediate Examination in Arts .. ..	189
" XXXII. Bachelor of Arts .. ..	214
" XXXIII. Master of Arts .. ..	249

	Page
<b>CHAPTER XXXIII-A.</b> Doctor of Philosophy in Arts or Science (D.Phil.) .. ..	<b>291</b>
"      XXXIV. Doctor of Literature .. ..	<b>294</b>
"      XXXIV-A. Bachelor of Commerce .. ..	<b>297</b>
"      XXXV. Intermediate Examination in Science .. ..	<b>315</b>
"      XXXV-A. Intermediate Examination (Science) in Agriculture .. ..	<b>343</b>
"      XXXVI. Bachelor of Science .. ..	<b>358</b>
"      XXXVI-A. Bachelor of Science (Technology) .. ..	<b>420</b>
"      XXXVII. Master of Science .. ..	<b>424</b>
"      XXXVII-A. Master of Science (Technology) .. ..	<b>400</b>
"      XXXVII-B. Certificate in Applied Psychology .. ..	<b>467</b>
"      XXXVII-C. Diploma in Social Work (Labour Welfare) .. ..	<b>470</b>
"      XXXVII-D. Diploma in Soap Technology .. ..	<b>476</b>
"      XXXVII-E. Diploma in Journalism .. ..	<b>482</b>
"      XXXVIII. Doctor of Science .. ..	<b>484</b>
"      XXXVIII-A. Certificate in Tanning .. ..	<b>487</b>
"      XXXIX. Licentiate in Teaching .. ..	<b>495</b>
"      XL. Bachelor of Teaching .. ..	<b>498</b>
"      XL-A. Diploma in Spoken English .. ..	<b>521</b>
"      XL-B. English Teachership Examination .. ..	<b>523</b>
"      XL-C. Teachers' Training Certificate Examinations .. ..	<b>526</b>
"      XL-D. Approval of Recognised Schools for B.T. Training .. ..	<b>537</b>
"      XL-E. Diploma in Domestic Science Training .. ..	<b>539</b>
"      XL-F. Diploma in Librarianship .. ..	<b>542</b>
"      XL-G. Certificate in Languages .. ..	<b>545</b>
"      XL-H. Diploma in Languages .. ..	<b>548</b>
"      XLI. Bachelor of Laws .. ..	<b>551</b>
"      XLII. Master of Laws .. ..	<b>558</b>
"      XLIII. Doctor of Laws .. ..	<b>560</b>
"      XLIV. First M.B.B.S. Examination .. ..	<b>562</b>
"      XLV. Final M.B.B.S. Examination .. ..	<b>566</b>
"      XLVI. Instruction after passing Final M.B.B.S. Examination .. ..	<b>576</b>
"      XLI-A-A. Transitory M.B. Regulations and Rules relating to the new M.B.B.S. Examinations .. ..	<b>577</b>
"      XLI-B. Special Regulations for admission to Final M.B.B.S. Examination .. ..	<b>581</b>
"      XLVII. Doctor of Medicine .. ..	<b>583</b>
"      XLI-III. Master of Surgery .. ..	<b>585</b>
"      XLIX. Master of Obstetrics .. ..	<b>587</b>
"      XLIX-A. Diploma in Ophthalmic Medicine and Surgery .. ..	<b>590</b>
"      XLIX-B. Diploma in Gynaecology and Obstetrics .. ..	<b>593</b>
"      XLIX-C. Diploma in Maternity and Child Welfare .. ..	<b>595</b>
"      XLIX-D. Diploma in Tuberculous Diseases .. ..	<b>601</b>
"      XLIX-E. Diploma in Dietetics .. ..	<b>610</b>
"      XLIX-F. Diploma in Child Health .. ..	<b>612</b>
"      L. Diploma in Public Health .. ..	<b>615</b>
"      L-A. Doctor of Science (Public Health) .. ..	<b>622</b>
"      L-B. Intermediate Examination in Nursing .. ..	<b>624</b>
"      L-C. Bachelor of Nursing .. ..	<b>626</b>
"      L-D. Diploma in Industrial Health .. ..	<b>628</b>

# CONTENTS

v

	Page
<b>CHAPTER</b>	
LI. Bachelor of Engineering Examination, Part I .. ..	633
„ LII. Bachelor of Engineering Examinations, Part II .. ..	644
„ Transitory Regulations .. ..	686
„ LII-A. Diploma in Town and Regional Planning .. ..	688
„ LII-B. Bachelor of Architecture .. ..	694
„ LII-C. Master of Planning .. ..	706
„ LII-D. Master of Architecture .. ..	710
„ LIII. Doctor of Science (Engineering) .. ..	712
„ LIII-A. Certificates in Military Studies .. ..	715
„ LIII-B. Master of Engineering (Public Health) .. ..	719
„ LIV. Academical Customs .. ..	722
<b>APPENDIX A—</b>	
Forms of Certificates and Diplomas .. ..	725
<b>APPENDIX B—</b>	
Form of Admission Register .. ..	738
Forms of Transfer Certificates .. ..	739
Form of Nomination Paper .. ..	740
Form of Register of Graduates .. ..	741
Form of Annual Return to be submitted by Affiliated Colleges on or before the 1st of August .. ..	742
<b>APPENDIX C—</b>	
List of Apparatus for Practical Classes in different subjects for (Intermediate, B.A., B.Sc., M.A., M.Sc.) Examinations .. ..	743
<b>APPENDIX D—</b>	
List of Appliances for the Matriculation Examination in different subjects .. ..	781
<b>APPENDIX E—</b>	
Duties of the Controller of Examinations .. ..	797
<b>APPENDIX F—</b>	
Further amendments in the Regulations .. ..	801
<b>APPENDIX G—</b>	
Now Syllabuses and Courses of Studies adopted by the Syndicate .. ..	805



# **ACT OF INCORPORATION**

**ACT NO. II OF 1857**

**Passed on the 24th January, 1857**

*An Act to establish and incorporate an University at Calcutta*

**Preamble.** WHEREAS, for the better encouragement of Her Majesty's subjects of all classes and denominations within the Presidency of Fort William in Bengal and other parts of India in the pursuit of a regular and liberal course of education, it has been determined to establish an University at Calcutta for the purpose of ascertaining, by means of examination, the persons who have acquired proficiency in different branches of Literature, Science, and Art, and of rewarding them by Academical Degrees as evidence of their respective attainments, and marks of honor proportioned thereunto; and whereas, for effectuating the purposes aforesaid, it is expedient that such University should be incorporated: It is enacted as follows (that is to say):—

**Incorporation.**

I. The following persons, namely,

The Right Honorable CHARLES JOHN VISCOUNT CANNING,  
Governor-General of India.

The Honorable JOHN RUSSELL COLVIN,  
Lieutenant-Governor of the North-Western Provinces.

The Honorable FREDERICK JAMES HALLIDAY,  
Lieutenant-Governor of Bengal.

The Honorable SIR JAMES WILLIAM COLVILLE, Knight,  
Chief Justice of the Supreme Court of Judicature in Bengal.

The Right Reverend DANIEL WILSON, Doctor of Divinity,  
Bishop of Calcutta.

The Honorable GEORGE ANSON, General,  
Commander-in-Chief of the Forces in India.

The Honorable JOSEPH ALEXANDER DORIN,  
Member of the Supreme Council of India.

The Honorable JOHN LOW, Major-General,  
Companion of the Most Honorable Order of the Bath,  
Member of the Supreme Council of India.

The Honorable JOHN PETER GRANT,  
Member of the Supreme Council of India.

The Honorable BARNES PEACOCK,  
Member of the Supreme Council of India.

CHARLES ALLEN, Esquire,  
Member of the Legislative Council of India.

HENRY RICKETTS, Esquire,  
Provisional Member of the Supreme Council of India.

CHARLES BINNY TREVOR, Esquire,  
Judge of the Sudder Court in Bengal.

Prince GHOLAM MUHAMMUD.  
WILLIAM RITCHE, Esquire, Advocate-General in Bengal.

CECIL BEADON, Esquire,  
Secretary to the Government of India.

Colonel HENRY GOODWYN of the Bengal Engineers,  
Chief Engineer in Bengal.

WILLIAM GORDON YOUNG, Esquire,  
Director of Public Instruction in Bengal.

Lieutenant-Colonel WILLIAM ERSKINE BAKER,  
of the Bengal Engineers,  
Secretary to the Government of India.

Lieutenant-Colonel ANDREW SCOTT WAUGH,  
of the Bengal Engineers, Surveyor-General of India.

KENNETH MACKINNON, Esquire, Doctor in Medicine.

HODGSON PRATT, Esquire,  
Inspector of Schools in Bengal.

HENRY WALKER, Esquire,  
Professor of Anatomy and Physiology in the Medical  
College of Bengal.

THOMAS THOMSON, Esquire, Doctor in Medicine,  
Superintendent of the Botanical Garden at Calcutta.

FREDERICK JOHN MOUAT, Esquire, Doctor in Medicine,  
and Fellow of the Royal College of Surgeons.

Lieutenant WILLIAM NASSAU LEES of the Bengal Infantry.

The Reverend WILLIAM KAY, Doctor of Divinity,  
Principal of Bishop's College.

The Reverend ALEXANDER DUFF, Doctor of Divinity.

THOMAS OLDHAM, Esquire,  
Superintendent of the Geological Survey of India.

HENRY WOODROW, Esquire,  
Inspector of Schools in Bengal.

LEONIDAS CLINT, Esquire,  
Principal of the Presidency College.

PROSONNO COOMAR TAGORE,  
Clerk Assistant of the Legislative Council of India.

RAMAPERSHAD RAY,  
Government Pleader in the Sudder Court of Bengal.

The Reverend JAMES OGILVIE, Master of Arts.  
The Reverend JOSEPH MULLEN, Bachelor of Arts.

Moulavy MUHAMMUD WUJEEH,  
Principal of the Calcutta Mudrasah.

ISHWAR CHUNDR A BIDYASAGUR,  
Principal of the Sanskrit College of Calcutta.

RAMGOPAUL GHOSE,  
Formerly Member of the Council of Education.

ALEXANDER GRANT, Esquire,  
Apothecary to the East India Company.

HENRY STEWART REID, Esquire,  
Director of Public Instruction in the North-Western Provinces,

being the first Chancellor, Vice-Chancellor, and Fellows of the said University, and all the persons who may hereafter become or be appointed to be Chancellor, Vice-Chancellor, or Fellows as hereinafter mentioned, so long as they shall continue to be such Chancellor, Vice-Chancellor, or Fellows, are hereby constituted and declared to be one Body Politic and Corporate by the name of the University of Calcutta; and such Body Politic shall by such name have perpetual succession, and shall have a common seal, and by such name shall sue and be sued, implead and be impleaded, and answer and be answered unto, in every Court of Justice within the territories in the possession and under the Government of the East India Company.



II. The said Body Corporate shall be able and capable in law to take, purchase, and hold any property, movable or immovable, which may become vested in it for the purposes of the said University by virtue of any purchase, grant, testamentary disposition, or otherwise; and shall be able and capable in law to grant, demise, alien, or otherwise dispose of, all or any of the property, movable or immovable, belonging to the said University; and also to do all other matters incidental or appertaining to a Body Corporate.

III. The said Body Corporate shall consist of one Chancellor, one Vice-Chancellor, and such number of ex-officio and other Fellows as the Governor-General of India in Council hath already appointed, or shall from time to time, by any order published in the *Calcutta Gazette*, hereafter appoint; and the Chancellor, Vice-Chancellor, and Fellows for the time being shall constitute the Senate of the said University: Provided that if any person being Chancellor, Vice-Chancellor, or Fellow of the said University, shall leave India without the intention of returning thereto, his office shall thereupon become vacant.

IV. The Governor-General of India for the time being shall be the Chancellor of the said University, and the first Chancellor shall be the Right Honorable Charles John Viscount Canning.

V. The first Vice-Chancellor of the said University shall be Sir James William Colville, Knight. The office of Vice-Chancellor shall be held for two years only; and the Vice-Chancellor hereinbefore nominated shall go out of office on the first day of January, 1859. Whenever a vacancy shall occur in the office of Vice-Chancellor of the said University by death, resignation, departure from India, effluxion of time, or otherwise, the Governor-General of India in Council shall, by notification in the *Calcutta Gazette*, nominate a fit and proper person, being one of the Fellows of the said University, to be Vice-Chancellor in the room of the person occasioning such vacancy: Provided that on any vacancy in the said office which shall occur by effluxion of time, the Governor-General of India in Council shall have power to re-appoint the Vice-Chancellor hereinbefore nominated or any future Vice-Chancellor to such office.

VI. The Lieutenant-Governors of Bengal and the North-Western Provinces, the Chief Justice of the Supreme Court of Judicature at Fort William in Bengal or of any Court of Judicature hereafter to

be constituted to or in which the powers of the said Supreme Court may be transferred or vested, the Bishop of Calcutta and the Members of the Supreme Council of India, all for the time being, shall be ex-officio Fellows of the said University. The whole number of the Fellows of the said University, exclusive of the Chancellor and Vice-Chancellor for the time being, shall never be less than thirty; and whenever the number of the said Fellows, exclusive as aforesaid, shall by death, resignation, departure from India, or otherwise, be reduced below thirty, the Governor-General of India in Council shall forthwith, by notification in the *Calcutta Gazette* nominate so many fit and proper persons to be Fellows of the said University as, with the then Fellows of the said University, shall make the number of such Fellows, exclusive as aforesaid, thirty. But nothing herein contained shall prevent the Governor-General of India in Council from nominating more than thirty persons to be Fellows of the said University if he shall see fit.

VII. The Governor-General of India in Council may cancel the appointment of any person already appointed, or hereafter to be appointed a Fellow of the University, and as soon as such order is notified in the *Gazette*, the person so appointed shall cease to be a Fellow.

VIII. The Chancellor, Vice-Chancellor, and Fellows for the time being shall have the entire management of and superintendence over the affairs, concerns, and property of the said University; and in all cases unprovided for by this Act, it shall be lawful for the Chancellor, Vice-Chancellor, and Fellows to act

in such manner as shall appear to them best calculated to promote the purposes intended by the said University. The said Chancellor, Vice-Chancellor, and Fellows

Bye-Laws. shall have full power from time to time to make and alter any bye-laws and regulations (so as the same be not repugnant to law, or to the general objects and provisions of this Act) touching the examination for degrees and the granting of the same; and touching the examination for honors and the granting of marks of honor for a higher proficiency in the different branches of Literature, Science, and Art; and touching the qualifications of the candidates for degrees and the previous course of instruction to be followed by them, and the preliminary examinations to be submitted to by them; and touching the mode and time of convening the meetings of the Chancellor, Vice-Chancellor, and Fellows; and, in general, touching all other matters whatever regarding the said University. And all such bye-laws and regulations, when reduced into writing, and after

the common seal of the said University shall have been affixed thereto, shall be binding upon all persons, members of the said University, and all candidates for degrees to be conferred by the same, provided such bye-laws and regulations shall have been first submitted to and shall have received the approval of the Governor-General of India in Council.

IX. All questions which shall come before the Chancellor, Vice-Chancellor, and Fellows, shall be decided at a meeting of the Senate by the majority of the members present; and the Chairman at any such meeting shall have a vote, and, in case of an equality of votes, a second or casting vote. No question shall be decided at any meeting, unless the Chancellor, or Vice-Chancellor, and five Fellows, or, in the absence of the Chancellor and Vice-Chancellor, unless six Fellows at the least, shall be present at the time of the decision. At every meeting of the Senate, the Chancellor, or in his absence the Vice-Chancellor, shall preside as Chairman; and, in the absence of both, a Chairman shall be chosen by the Fellows present, or the major part of them.

X. The said Chancellor, Vice-Chancellor, and Fellows for the time being shall have full power from time to time to appoint, and, as they shall see occasion, to remove all Examiners, Officers, and servants of the said University.

Appointment and removal of Examiners and Officers.

XI. The said Chancellor, Vice-Chancellor, and Fellows shall have power, after examination, to confer the several degrees of Bachelor of Arts, Master of Arts, Bachelor of Laws, Licentiate of Medicine, Doctor of Medicine, and Master of Civil Engineering; they shall also have power, after examination, to confer upon the candidates for the said several degrees marks of honour for a high degree of proficiency in the different branches of Literature, Science, and Art, according to rules to be determined by the bye-laws to be from time to time made by them under the power in that behalf given to them by this Act.

Power to confer degrees.

XII. Except by special order of the Senate, no person shall be admitted as a candidate for the degree of Bachelor of Arts, Master of Arts, Bachelor of Laws, Licentiate of Medicine, Doctor of Medicine, or Master of Civil Engineering, unless he shall present to the said Chancellor, Vice-Chancellor, and Fellows, a certificate from one of the Institutions authorised in that behalf by the Governor-General of India in Council, to the effect that he has completed the course of instruction prescribed by the Chancellor, Vice-Chancellor, and

Qualification for admission of candidates for degrees.

Fellows of the said University, in the bye-laws to be made by them under the power in that behalf given by this Act.

XIII. The said Chancellor, Vice-Chancellor, and Fellows shall cause an examination for degrees to be held at least once in every year; on every such examination the candidates shall be examined either by Examiners appointed for the purpose from among the Fellows by the said Chancellor, Vice-Chancellor, and Fellows, or by other Examiners so to be appointed; and on every such examination, the candidates, whether candidates for an ordinary degree or for a degree with honours, shall be examined on as many subjects and in such manner as the said Chancellor, Vice-Chancellor, and Fellows shall appoint.

XIV. At the conclusion of every examination of the candidates, the Examiners shall declare the name of every candidate whom they shall have deemed entitled to any of the said degrees, and his proficiency in relation to other candidates; and also the honours which he may have gained in respect of his proficiency in that department of knowledge in which he is about to graduate; and he shall receive from the said Chancellor a certificate, under the seal of the said University of Calcutta and signed by the said Chancellor or Vice-Chancellor, in which the particulars so stated shall be declared.

XV. The said Chancellor, Vice-Chancellor, and Fellows shall have power to charge such reasonable fees for the degrees to be conferred by them, and upon admission into the said University, and for continuance therein, as they, with the approbation of the Governor-General of India in Council, shall from time to time see fit to impose. Such fees shall be carried to one General Fee Fund for the payment of expenses of the said University, under the directions and regulations of the Governor-General of India in Council, to whom the accounts of income and expenditure of the said University shall once in every year be submitted for such examination and audit as the said Governor-General of India in Council may direct.

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# THE INDIAN UNIVERSITIES ACT, 1904

## [VIII OF 1904]

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### CONTENTS

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#### SECTIONS

1. Short title and commencement.

2. Interpretation.

#### *The University*

3. Incorporation and powers of the University.

4. Constitution and powers of the Senate.

#### *Fellows*

5. *Ex-officio* Fellows.

6. Ordinary Fellows.

7. Ordinary Fellows elected by Registered Graduates.

8. Ordinary Fellows elected by Senates.

9. Election by the Faculties.

10. Nomination by the Chancellor.

11. Vacating of office.

#### *Transitory Provisions*

12. Election and nomination of Ordinary Fellows within one year after commencement of Act and temporary continuance of existing University administration.

#### *Honorary Fellows*

13. Honorary Fellows.

#### *Faculties and Syndicate*

14. Faculties.

15. Syndicate.

#### *Degrees*

16. Degrees, diplomas, licenses, titles and marks of honour.

17. Honorary degrees.

18. Cancellation of degrees and the like.

#### *Affiliated Colleges*

19. Certificate required of candidates for examination.

20. Existing Colleges.

21. Affiliation.

22. Extension of affiliation.

23. Inspection and Reports.

24. Disaffiliation.

#### *Regulations*

25. Regulations.

26. New body of regulations.

*Miscellaneous*

27. Territorial exercise of powers.

28. Rector.

29. Repeals.

THE FIRST SCHEDULE—*Ex-officio* FELLOWS OF THE UNIVERSITY.

THE SECOND SCHEDULE—ENACTMENTS REPEALED.

## ACT No. VIII OF 1904

PASSED BY THE GOVERNOR-GENERAL OF INDIA IN COUNCIL

*(Received the assent of the Governor-General on the 24th  
March, 1904)*

*This Act came into force on the 1st September, 1904*

*An Act to amend the law relating to the Universities of  
British India*

WHEREAS by Acts II, XXII and XXVII of 1857, Act XIX of 1882 and Act XVIII of 1887, Universities were established and incorporated at Calcutta, Bombay, Madras, Lahore and Allahabad ;

And whereas by Act XLVII of 1860 the Universities of Calcutta, Madras and Bombay were empowered to confer such degrees as should be appointed in the manner provided by the Act ;

And whereas by Act I of 1884 the Universities of Calcutta, Madras and Bombay were further empowered to confer the honorary degree of Doctor in the Faculty of Law ;

And whereas it is expedient to amend the law relating to the Universities of British India ;

It is hereby enacted as follows :—

1. (1) This Act may be called the Indian Universities Act, 1904 ; and

(2) It shall come into force on such date as the Government may fix in this behalf by notification in the *Gazette of India*, or the local official Gazette, as the case may be.

Short title and commencement.

2. (1) This Act shall be deemed to be part of each of the Acts by which the said five Universities were respectively established and incorporated.

Interpretation.

(2) In this Act, unless there is anything repugnant in the subject or context,—

- (a) the term “College” or “affiliated College” includes any collegiate institution affiliated to or maintained by the University :
- (b) the expression “the Government” means in relation to the University of Calcutta the Governor-General in Council and in relation to the other Universities the Local Government : and
- (c) the expression “the University” and “the Act of Incorporation” and any expression denoting any University, authority or officer or any statute, regulation, rule or bye-law of the University shall be construed with reference to each of the said Universities respectively.

### *The University*

3. The University shall be and shall be deemed to have been incorporated for the purpose (among others) of making provision for the instruction of students, with power to appoint University Professors and Lecturers, to hold and manage educational endowments, to erect, equip and maintain University libraries, laboratories and museums, to make regulations relating to the residence and conduct of students, and to do all acts, consistent with the Act of Incorporation and this Act, which tend to the promotion of study and research.

4. (1) Notwithstanding anything contained in the Act of Constitution and Incorporation, the Body Corporate of the powers of the Senate. University shall consist of—

- (a) the Chancellor ;
- (b) in the case of the University of Calcutta, the Rector ;
- (c) the Vice-Chancellor ;
- (d) the *Ex-officio* Fellows ; and
- (e) the Ordinary Fellows—
  - (i) elected by registered Graduates or by the Senate.
  - (ii) elected by the Faculties, and
  - (iii) nominated by the Chancellor.

(2) The Ordinary Fellows shall, save as herein otherwise provided, hold office for five years :

Provided that an Ordinary Fellow who has vacated his office may, subject to the provisions of this Act, be elected or nominated to be an Ordinary Fellow.

(3) The Body Corporate shall be the Senate of the University, and all powers which are by the Act of Incorporation or by this Act conferred upon the Senate, or upon the Chancellor, Vice-Chancellor and Fellows in their corporate capacity, or, in the case of the University of Calcutta, upon the Chancellor, Rector, Vice-Chancellor and Fellows in their corporate capacity, shall be vested in, and exercised by, the Senate constituted under this Act, and all duties and liabilities imposed upon the University by the Act of Incorporation shall be deemed to be imposed upon the Body Corporate as constituted under this Act.

(4) No act done by the University shall be deemed to be invalid merely by reason of any vacancy among either class of elected Ordinary Fellows, or by reason of the total number of Ordinary Fellows or of members of the profession of education to be included among Ordinary Fellows, being less than the minimum prescribed by this Act.

### *Fellows*

5. (1) Notwithstanding anything contained in the Act of Incorporation, the persons for the time being performing the duties of the offices mentioned in the list contained in the first schedule to this Act or added to the said list under sub-section (2) shall be the *ex-officio* Fellows of the University.

(2) The Government may, by notification published in the *Gazette of India* or in the local official Gazette, as the case may be, make additions to, or alterations in, the list of offices contained in the said schedule :

Provided that the number of *ex-officio* Fellows shall not exceed ten.

6. (1) In the case of the Universities of Calcutta, Bombay and Madras, the number of Ordinary Fellows shall not be less than fifty nor exceed one hundred ; and of such number—

- (a) ten shall be elected by registered Graduates ;
- (b) ten shall be elected by the Faculties ; and
- (c) the remainder shall be nominated by the Chancellor.

(2) In the case of the Universities of the Punjab and Allahabad, the number of Ordinary Fellows shall not be less than forty nor exceed seventy-five ; and of such number—

- (a) ten shall be elected by the Senate or by registered Graduates ;
- (b) five shall be elected by the Faculties ; and
- (c) the remainder shall be nominated by the Chancellor.

(3) The election of any Ordinary Fellow shall be subject to the approval of the Chancellor.



(4) Elections of the Ordinary Fellows by the Faculties and nominations of such Fellows by the Chancellor under this section shall be made in such manner as to secure that not less than two-fifths of the Fellows so elected and so nominated respectively shall be persons following the profession of education.

7. (1) Once in every year, on such date as the Chancellor may appoint in this behalf, there shall, if necessary, be an election to fill any vacancy among the Ordinary Fellows elected by registered Graduates.

(2) The Syndicate shall maintain a register on which any Graduate who (a) has taken the degree of Doctor or Master in any Faculty, or (b) has graduated in any Faculty not less than ten years before registration, shall, subject to the payment of an initial fee of such amount as may be prescribed by the regulations, be entitled to have his name entered upon application made within the period of three years from the commencement of this Act or of one year from the date on which he becomes so entitled :

Provided that, if such application is made after the expiry of either of the said periods, the applicant shall be entitled to have his name entered on payment of the said initial fee, and of such further sum as may be prescribed by the regulations.

(3) The name of any Graduate entered on the register shall, subject to the payment of an annual fee of such amount as may be prescribed by the regulations, be retained thereon, and, in case of default, shall be removed therefrom, but shall, at any time, be re-entered upon payment of all arrears :

Provided that a Graduate whose name has been already entered on the register may at any time compound for all subsequent payments of the annual fee by paying the sum prescribed in this behalf by the regulations.

(4) No person other than a Graduate whose name is entered on the said register shall be qualified to vote or to be elected at an election held under sub-section (1).

(5) A Graduate registered under this section shall be entitled to such further privileges as may be determined by the regulations.

8. (1) The provisions of Section 7 shall not apply to the University of the Punjab or to the University of Allahabad until the Chancellor, with the previous sanction of the Governor-General in Council and by notification in the local official Gazette, so directs; and until such time the Ordinary Fellows of the said Universities, who would be elected by registered Graduates if the said provisions were in force, shall be elected by the Senate.

(2) In the case of the University of the Punjab and the University of Allahabad, there shall, if necessary, be an election, once in every year, on such date as the Chancellor may appoint in this behalf, to fill any vacancy among the Ordinary Fellows elected by the Senate.

9. (1) Once in every year, on such date as the Chancellor may appoint in this behalf, there shall, if necessary, be an election to fill any vacancy among the Ordinary Fellows elected by the Faculties.

(2) An election under sub-section (1) shall be held, subject to such directions prescribing the qualifications of the persons to be elected as may, from time to time, be given by the Chancellor, with a view to secure the return of duly qualified persons and the fair representation of different branches of study in the Senate.

10. Subject to the provisions of Section 6, the Chancellor may nominate any number of fit and proper persons to be Ordinary Fellows.

11. (1) Any Ordinary Fellow may, by a letter addressed to the Chancellor, resign his office.

(2) Where any Ordinary Fellow has not attended a meeting of the Senate, other than a Convocation, during the period of one year, the Chancellor may declare his office to be vacated.

### *Transitory Provisions*

12. In their application to the election and nomination of Ordinary Fellows within the period of one year after the commencement of this Act and to the current business of the University, the provisions of this Act shall be read as subject to the following restrictions and modifications :—

- (a) In the case of the Universities of Calcutta, Bombay and Madras, the Chancellor shall, as soon as may be after the commencement of this Act, make an order directing that the Ordinary Fellows, who under the said provisions are to be elected by Registered Graduates, shall be elected by the elected Fellows holding office at the commencement of the Act, or by such Graduates of the University as the Chancellor may determine, or partly by elected Fellows and partly by such Graduates, and in such manner as the Chancellor may direct.
- (b) When the Ordinary Fellows mentioned in clause (a)

- have been elected, the Chancellor shall proceed to the nomination of Ordinary Fellows under Section 6, sub-section (1), clause (c).
- (c) The Ordinary Fellows mentioned in clauses (a) and (b) shall, as soon as may be after their appointment and in such manner as the Chancellor may direct, elect the Fellows who under the said provisions are to be elected by the Faculties.
  - (d) In the case of the Universities of the Punjab and Allahabad, the Chancellor shall, as soon as may be after the commencement of this Act, proceed to nominate Ordinary Fellows under Section 6, sub-section (2), clause (c).
  - (e) When Ordinary Fellows have been appointed under clause (d), the Chancellor shall make an order directing that the Fellows who under the said provisions are to be elected by the Senate, shall be elected by the Ordinary Fellows appointed under clause (d), or by elected Fellows holding office at the commencement of this Act, or partly by such Ordinary Fellows and partly by elected Fellows, in such manner as the Chancellor may direct.
  - (f) The Ordinary Fellows mentioned in clauses (d) and (e) shall, as soon as may be after their appointment, and in such manner as the Chancellor may direct, elect the Fellows who under the said provisions are to be elected by the Faculties.
  - (g) An election under clause (c) or clause (f) shall be made subject to such directions prescribing the qualifications of the persons to be elected as may be given by the Chancellor, with a view to secure the return of duly qualified persons and a fair representation of different branches of study in the Senate.
  - (h) As soon as Ordinary Fellows have been nominated and elected under clauses (a), (b) and (c), or under clauses (d), (e) and (f), as the case may be and the persons so elected have been approved by the Chancellor, the Chancellor shall declare that the Body Corporate of the University has been constituted in accordance with the provisions of this Act, and shall append to the declaration a list of the Senate, and shall forward the said declaration and the appended list to the Governor-General in Council, who shall cause the declaration and the list to be published in the *Gazette of India*.
  - (i) The seniority of the Fellows included in the list mentioned in clause (h) shall be determined by the order in which their names appear in the list.

- (j) Until the said declaration is published under clause (h) the Fellows holding office at the commencement of this Act shall, together with the Chancellor and the Vice-Chancellor, continue to be the Senate of the University, and shall be entitled to exercise the powers conferred upon them by the Act of Incorporation.
- (k) Every Ordinary Fellow elected or nominated under this section shall, unless his Fellowship is previously vacated by death, resignation or any other cause, hold office for not less than three years.
- (l) At or about the end of the third year from the publication of declaration mentioned in clause (h), the names of, as nearly as may be, one-fifth of the total initial number—
  - (i) of Ordinary Fellows elected under clause (a) or clause (e), as the case may be,
  - (ii) of Ordinary Fellows elected under clause (c) or clause (f), and
  - (iii) of Ordinary Fellows nominated by the Chancellor,(after deducting from the said one-fifth the names in each class which have previously been removed from the list mentioned in clause (h) by reason of death, resignation or any other cause) shall be drawn by lot from among the elected and the nominated Ordinary Fellows whose names were included in the list mentioned in clause (h), and those whose names are so shown shall thereupon cease to be Ordinary Fellows.
- (m) At or about the end of the fourth, fifth and sixth years from the publication of the said declaration, the names of Ordinary Fellows shall be drawn by lot from each class of Ordinary Fellows included in the said list, in the manner provided in clause (l), so as, to secure that, as nearly as may be, one-fifth of the Fellowships of the Ordinary Fellows so included in each class shall be vacated in each year.
- (n) An Ordinary Fellow elected or nominated under this section, who has not previously vacated his Fellowship, shall cease to be a Fellow at the end of the seventh year from the publication of the said declaration.
- (o) The Vice-Chancellor holding office at the commencement of this Act shall continue to hold office until the publication of the said declaration, and shall, if he is a member of the Senate as constituted under this Act, continue to hold office as Vice-Chancellor for the remainder of the term for which he was originally appointed.

- (p) The Members of the Syndicate holding office at the commencement of this Act shall continue to conduct the executive business of the University until the publication of the said declaration; and, upon such publication, the Senate shall, in such manner as the Chancellor may direct, appoint a provisional Syndicate to conduct the executive business of the University until the Syndicate has been constituted under this Act.
- (q) The Senate as constituted under this Act may give orders for the provisional constitution of Faculties, Boards of Studies and of any Board or Committee of the Senate, pending the constitution of such Faculties, Boards and Committees, in conformity with the regulations.
- (r) University Examiners and all officers and servants of the University shall continue to hold office and to act, subject to the conditions governing their tenure of office or employment, except in so far as such conditions may be altered by competent authority.
- (s) The statutes, regulations and bye-laws of the University in force at the commencement of this Act shall continue to be in force, except in so far as the said statutes, regulations and bye-laws shall be altered or repealed by competent authority.

### *Honorary Fellows*

13. (1) (a) A Fellow holding office at the commencement of this Act shall cease to be a Fellow.

Honorary Fellows. (b) Where a Fellow included in clause (a) does not become a Fellow under this

Act, he shall be an Honorary Fellow for life.

(c) Where a Fellow included in clause (a) becomes a Fellow under this Act, he shall, whenever and so often as he ceases to be a Fellow under this Act, become an Honorary Fellow as provided in clause (b).

(2) The Chancellor may nominate any person to be an Honorary Fellow for life, who is eminent for his attainments in any branch of learning, or is an eminent benefactor of the University, or is distinguished for services rendered to the cause of education generally.

(3) Notwithstanding anything contained in this section, any Fellow who at the commencement of this Act is entitled as such to vote for the election of any person to be a member of any Council for the purpose of making laws and regulations or of any local authority shall continue to be so entitled as if this Act had not been passed.

*Faculties and Syndicate*

14. (1) Nothing contained in the Act of Incorporation shall be deemed to prohibit the constitution of a new Faculty or the abolition or reconstitution of any existing Faculty by the Senate under regulations made in accordance with the provisions of this Act.

(2) Regulations made under sub-section (1) may—

- (a) provide for the assignment of Fellows to the several Faculties by order of the Senate; and
- (b) empower the Fellows so assigned to add to their number, in such manner and for such period as may be prescribed, Graduates in the Faculty and other persons possessing special knowledge of the subjects of study represented by the Faculty :

Provided that the number of persons so to be added to the Faculty shall not exceed half the number of Fellows assigned to the Faculty.

(3) A person added to a Faculty under sub-section (2), clause (b), shall have the right to take part in the ordinary business of the Faculty, and in any election of an Ordinary Fellow by the Faculty, but shall not be entitled to take part in the election of the Syndicate.

15. (1) The executive government of the University shall be vested in the Syndicate, which shall consist of—

- (a) The Vice-Chancellor as Chairman ;
- (b) the Director of Public Instruction for the Province in which the headquarters of the University are situated ; and, in the case of the University of Allahabad, also the Director of Public Instruction in the Central Provinces ; and
- (c) not less than seven or more than fifteen *e-officio* or Ordinary Fellows, elected by the Senate or by the Faculties in such manner as may be provided by the regulations, to hold office for such period as may be prescribed by the regulations.

(2) The regulations referred to in sub-section (1) shall be so framed as to secure that a number, not falling short by more than one of a majority of the elected members of the Syndicate, shall be Heads of, or Professors in, Colleges affiliated to the University.

(3) If in the case of any election the question is raised whether any person is or is not a Professor within the meaning of sub-section (2), the question shall be decided by the Senate.

*Degrees*

16. The Senate may institute and confer such degrees, and  
 Degrees, diplomas, grant such diplomas, licenses, titles and  
 licenses, titles and marks of honour in respect of degrees and  
 marks of honour. examinations as may be prescribed by  
 regulation.

17. Where the Vice-Chancellor and not less than two-  
 thirds of the other members of the Syndi-  
 Honorary degrees. cate recommend that an honorary degree  
 be conferred on any person on the ground  
 that he is, in their opinion, by reason of eminent position and  
 attainments, a fit and proper person to receive such a degree,  
 and where their recommendation is supported by not less than  
 two-thirds of the Fellows present at a meeting of the Senate  
 and is confirmed by the Chancellor, the Senate may confer on  
 such person the honorary degree so recommended without re-  
 quiring him to undergo any examination.

18. Where evidence is laid before the Syndicate showing  
 Cancellation of that any person on whom a degree, diploma,  
 degrees and the like. license, title or mark of honour conferred  
 or granted by the Senate has been  
 convicted of what is, in their opinion, a serious offence, the Syndi-  
 cate may propose to the Senate that the degree, diploma, license,  
 title or mark of honour be cancelled, and, if the proposal  
 is accepted by not less than two-thirds of the Fellows present  
 at a meeting of the Senate and is confirmed by the Chancellor,  
 the degree, diploma, license, title or mark of honour shall be  
 cancelled accordingly.

*Affiliated Colleges*

19. Save on the recommendation of the Syndicate, by  
 special order of the Senate, and subject to  
 Certificate required of candidates for examination. any regulations made in this behalf, no  
 person shall be admitted as a candidate  
 at any University examination, other than  
 an examination for Matriculation, unless he produces a certifi-  
 cate from a College affiliated to the University, to the effect  
 that he has completed the course of instruction prescribed by  
 regulation.

20. Any College affiliated to the University before the  
 Existing Colleges. passing of this Act may continue to exer-  
 cise the rights conferred upon it by such  
 affiliation, save in so far as such rights may be withdrawn or  
 restricted in the exercise of any power conferred by the Act of  
 Incorporation or by this Act.

21. (1) A College applying for affiliation to the University shall send a letter of application to the Registrar, and shall satisfy the Syndicate—
- Affiliation.
- (a) that the College is to be under the management of a regularly constituted governing body ;
  - (b) that the qualifications of the teaching staff and the conditions governing their tenure of office are such as to make due provision for the courses of instruction to be undertaken by the College ;
  - (c) that the buildings in which the College is to be located are suitable, and that provision will be made, in conformity with the regulations, for the residence, in the College or in lodgings approved by the College, of students not residing with their parents or guardians, and for the supervision and physical welfare of students ;
  - (d) that due provision has been or will be made for a library ;
  - (e) where affiliation is sought in any branch of experimental science, that arrangements have been or will be made in conformity with the regulations for imparting instruction in that branch of science in a properly equipped laboratory or museum ;
  - (f) that due provision will, so far as circumstances may permit, be made for the residence of the Head of the College and some members of the teaching staff in or near the College or the place provided for the residence of students ;
  - (g) that the financial resources of the College are such as to make due provision for its continued maintenance ;
  - (h) that the affiliation of the College, having regard to the provision made for students by other Colleges in the same neighbourhood, will not be injurious to the interests of education or discipline ; and
  - (i) that the College rules fixing the fees (if any) to be paid by the students have not been so framed as to involve such competition with any existing College in the same neighbourhood as would be injurious to the interests of education.

The application shall further contain an assurance that after the College is affiliated any transference of management and all changes in the teaching staff shall be forthwith reported to the Syndicate.

(2) On receipt of a letter of application under sub-section (1), the Syndicate shall—

- (a) direct a local inquiry to be made by a competent person authorized by the Syndicate in this behalf ;



- (b) make such further inquiry as may appear to them to be necessary ; and
- (c) report to the Senate on the question whether the application should be granted or refused, either in whole or in part, embodying in such report, the results of any inquiry under clauses (a) and (b).

And the Senate shall, after such further inquiry (if any), as may appear to them to be necessary, record their opinion on the matter.

(3) The Registrar shall submit the application and all proceedings of the Syndicate and Senate relating thereto to the Government, who, after such further inquiry as may appear to them to be necessary, shall grant or refuse the application or any part thereof.

(4) Where the application or any part thereof is granted, the order of the Government shall specify the courses of instruction in respect of which the College is affiliated ; and, where the application or any part thereof is refused, the grounds of such refusal shall be stated.

(5) An application under sub-section (1) may be withdrawn at any time before an order is made under sub-section (3).

22. Where a College desires to add to the courses of instruction in respect of which it is affiliated, the procedure prescribed by Section 21 shall, so far as may be, be followed.

23. (1) Every College affiliated to the University, whether before or after the commencement of this Act, shall furnish such reports, returns and other information as the Syndicate may require to enable it to judge of the efficiency of the College.

(2) The Syndicate shall cause every such College to be inspected from time to time by one or more competent persons authorized by the Syndicate in this behalf.

(3) The Syndicate may call upon any College so inspected to take, within a specified period, such action as may appear to them to be necessary in respect of any of the matters referred to in Section 21, sub section (1).

24. (1) A member of the Syndicate who intends to move that the rights conferred on any College by affiliation be withdrawn, in whole or in part, shall give notice of his motion, and shall state in writing the grounds on which the motion is made.

(2) Before taking the said motion into consideration, the Syndicate shall send a copy of the notice and written statement mentioned in sub-section (1) to the Head of the College concerned, together with an intimation that any representation in writing submitted, within a period specified in such intimation, on behalf of the College, will be considered by the Syndicate :

Provided that the period so specified may, if necessary, be extended by the Syndicate.

(3) On receipt of the representation or on expiration of the period referred to in sub-section (2), the Syndicate, after considering the notice of motion, statement and representation and after such inspection by any competent person authorized by the Syndicate in this behalf, and such further inquiry as may appear to them to be necessary, shall make a report to the Senate.

(4) On receipt of the report under sub-section (3), the Senate shall, after such further inquiry (if any) as may appear to them to be necessary, record their opinion on the matter.

(5) The Registrar shall submit the proposal and all proceedings of the Syndicate and Senate relating thereto to the Government, who, after such further inquiry (if any) as may appear to them to be necessary, shall make such order as the circumstances may, in their opinion, require.

(6) Where by an order made under sub-section (5) the rights conferred by affiliation are withdrawn, in whole or in part, the grounds for such withdrawal shall be stated in the order.

### *Regulations*

25. (1) The Senate, with the sanction of the Government, may from time to time make regulations consistent with the Act of Incorporation as amended by this Act and with this Act to provide for all matters relating to the University.

(2) In particular, and without prejudice to the generality of the foregoing power, such regulations may provide for—

- (a) the procedure to be followed in holding any election of Ordinary Fellows ;
- (b) the constitution, reconstitution or abolition of Faculties, the proportion in which the members, other than the *ex-officio* members, or the Syndicate shall be elected to represent the various Faculties and the mode in which such election shall be conducted ;
- (c) the procedure at meetings of the Senate, Syndicate and Faculties and the quorum of members to be required for the transaction of business ;
- (d) the appointment of Fellows and others to be members of Boards of Studies, and the procedure of such Boards and the quorum of members to be required for the transaction of business ;
- (e) the appointment and duties of the Registrar and of officers and servants of the University, and of Professors and Lecturers appointed by the University ;

- (f) the appointment of Examiners, and the duties and powers of Examiners, in relation to the Examinations of the University ;
- (g) the form of the certificate to be produced by a candidate for Examination under Section 19 and the conditions on which any such certificate may be granted ;
- (h) the registers of graduates and students to be kept by the University, and the fee (if any) to be paid for the entry or retention of a name on any such register ;
- (i) the inspection of Colleges and the reports, returns and other information to be furnished by Colleges ;
- (j) the registers of students to be kept by Colleges affiliated to the University ;
- (k) the rules to be observed and enforced by Colleges affiliated to the University in respect of the transfer of students ;
- (l) the fees to be paid in respect of the courses of instruction given by Professors or Lecturers appointed by the University ;
- (m) the residence and conduct of students ;
- (n) the courses of study to be followed and the conditions to be complied with by candidates for any University Examination, other than an Examination for Matriculation, and for degrees, diplomas, licenses, titles, marks of honour, scholarships and prizes conferred or granted by the University ;
- (o) the conditions to be complied with by schools desiring recognition for the purpose of sending up pupils as candidates for the Matriculation Examination and the conditions to be complied with by candidates for Matriculation, whether sent up by recognised schools or not ;
- (p) the conditions to be complied with by candidates, not being students of any College affiliated to the University, for degrees, diplomas, licenses, titles, marks of honour, scholarships and prizes conferred or granted by the University ; and
- (q) the alteration or cancellation of any rule, regulation, statute or bye-law of the University in force at the commencement of this Act.

26. (1) Within one year after the commencement of this New body of Re- Act or within such further period as the gulations. Government may fix in this behalf,—

- (a) the Senate as constituted under this Act shall cause a revised body of regulations to be prepared and submitted for the sanction of the Government ;

- (b) if any additions to, or alterations in, the draft submitted appear to the Government to be necessary, the Government, after consulting the Senate, may sanction the proposed body of regulations with such additions and alterations as appear to the Government to be necessary.
- (2) Where a draft body of regulations is not submitted by the Senate within the period of one year after the commencement of this Act, or within such further period as may be fixed under sub-section (1), the Government may, within one year after the expiry of such period or of such further period, make regulations which shall have the same force as if they had been prepared and sanctioned under sub-section (1).

### *Miscellaneous*

27. The Governor-General in Council may, by general or special order, define the territorial limits within which, and specify the Colleges in respect of which, any powers conferred by or under the Act of Incorporation or this Act shall be exercised.

Territorial exercise of powers.

28. (1) The Lieutenant-Governor of Bengal, for the time being, shall be the Rector of the University of Calcutta, and shall have precedence in any Convocation of the said University next after the Chancellor and before the Vice-Chancellor.

Rector.

(2) The Chancellor may delegate any power conferred upon him by the Act of Incorporation or this Act to the Rector.

29. The Acts mentioned in the second schedule are hereby repealed to the extent specified in the fourth column thereof.

Repeals.

## THE FIRST SCHEDULE

(Section 5)

### *Ex-officio* FELLOWS OF THE UNIVERSITY

#### *The University of Calcutta*

The Chief Justice of the High Court of Judicature at Fort William in Bengal.  
The Lord Bishop of Calcutta.

The Civil Ordinary Members of the Council of the Governor-General.  
The Directors of Public Instruction, Bengal, Burma and Assam.

*The University of Bombay*

The Chief Justice of the High Court of Judicature at Bombay.  
The Bishop of Bombay.  
The Ordinary Members of the Council of the Governor of Bombay.  
The Director of Public Instruction in Bombay.

*The University of Madras*

The Chief Justice of the High Court of Judicature at Madras.  
The Bishop of Madras.  
The Ordinary Members of the Council of the Governor of Madras.  
The Director of Public Instruction in Madras.

*The University of the Punjab*

The Chief Judge of the Chief Court of the Punjab.  
The Bishop of Lahore.  
The Director of Public Instruction in the Punjab.  
The representatives of such Chiefs (if any) of territories not comprised in British India as the Local Government may, by notification in local official Gazette, specify in this behalf.

*The University of Allahabad*

The Chief Justice of the High Court of Judicature for the North-Western Provinces.  
The Bishop of Lucknow.  
The Directors of Public Instruction in the United Provinces of Agra and Oudh and in the Central Provinces.

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## THE SECOND SCHEDULE

(Section 29)

## ENACTMENTS REPEALED

Year	No.	Short title	Extent of repeal
1857	II	The Calcutta University Act, 1857.	In section 2, the word "said" wherever it occurs. In section 3, the first sentence and the words "Provided that." In section 5, the words "in the Calcutta Gazette." Section 6. Section 8, except the first sentence.
1857	XXII	The Bombay University Act, 1857.	Sections 9, 10, 11, 12, 13 and 14. In section 2, the word "said" wherever it occurs. In section 3, the first sentence and the words "Provided that." Section 6. Section 8, except the first sentence.
1857	XXVII	The Madras University Act, 1857.	Sections 9, 10, 11, 12, 13 and 14. In section 2, the word "said" wherever it occurs. In section 3, the first sentence and the words "Provided that." Section 6. Section 8, except the first sentence.
1860	XLVII	The Indian Universities (Degrees) Act, 1860.	Sections 9, 10, 11, 12, 13 and 14. The whole Act.
1882	XIX	The Punjab University Act, 1882.	Section 6. In section 7, sub-section (1). In section 8, in sub-section (1), the words after the word "Fellow" to the end of the sub-section, and in sub-section (2), the words from the word "appointed" to the words "this Act." In section 9, the words "under this Act."

Year	No.	Short title	Extent of repeal
1882	XIX	The Punjab University Act, 1882.	<p>Sections 10 and 11.</p> <p>Section 12, except the last paragraph.</p> <p>Sections 13, 14, 15, 16 and 18.</p> <p>In section 20, the words "made or," "section six, clauses (b) and (c) and " and "under sections fourteen, fifteen and sixteen."</p> <p>In the Schedule, Part I.</p>
1884	I	The Indian Universities (Honorary Degrees) Act, 1884	The whole Act.
1887	XVIII	The Allahabad University Act, 1887.	<p>Section 5.</p> <p>In section 6, sub-section (1).</p> <p>In section 7, sub-section (1) and in sub-section (2), the words after the word, "Fellow " to the end of the sub-section.</p> <p>Sections 10, 11, 12, 13, 14, 15 and 17.</p> <p>In section 20, the words and figures "appointments made and," "under section 5, sub-section (1), clauses (b) and (c)," "under sections 14 and 15 " and "under section 17."</p> <p>In the Schedule, Part I.</p>

ACT No. II OF 1905

PASSED BY THE GOVERNOR-GENERAL OF INDIA IN COUNCIL

(Received the assent of the Governor-General on the  
10th February, 1905)

*An Act to validate action taken under the Indian Universities Act, 1904)*

Whereas the Indian Universities Act, 1904 (VIII of 1904), authorizes the Chancellor of each of the Indian Universities to make directions, declarations and orders with a view to the constitution of the Body Corporate and the appointment of the Provisional Syndicate thereof :

And whereas various directions, declarations and orders have been made in pursuance of the said authority, and Bodies Corporate and Provisional Syndicates have been constituted and appointed thereunder ;

And whereas doubts have been raised as to the construction of the said Act and as to the validity of some of the said directions, declarations and orders and as to the validity of the constitution and appointment of some of the Bodies Corporate and Provisional Syndicates, and it is expedient to remove such doubts :

It is hereby enacted as follows :—

- |   |   |
|---|---|
| 1. This Act may be called the Indian Universities (Validation) Act, 1905.   |   |
| 2. All directions, declarations and orders made as aforesaid shall be deemed to have been duly made under the Indian Universities Act, 1904 (VIII of 1904).               | Validation of directions, declarations and orders.    |
| 3. The Bodies Corporate and Provisional Syndicates constituted and appointed as aforesaid shall be deemed to have been duly constituted and appointed under the said Act. | Validation of constitution and appointment of Bodies. |



ACT No. XI OF 1911

PASSED BY THE GOVERNOR-GENERAL OF INDIA IN COUNCIL.

(Received the assent of the Governor-General on the  
21st March, 1911)

*An Act to amend the Indian Universities Act, 1904  
(VIII of 1904)*

Whereas it is expedient to amend the Indian Universities Act, 1904 ;

It is hereby enacted as follows :—

1. This Act may be called the Indian Universities (Amendment) Act, 1911.
2. To Section 6, sub-section (2), of the said Act the following proviso should be added, namely :—

“ Provided that in the case of the University of Allahabad the Chancellor may direct that such number as he may specify of the Ordinary Fellows referred to in clause (a) shall be elected by the Senate and the remainder by registered Graduates.”

## ACT No. VII OF 1921

PASSED BY THE INDIAN LEGISLATIVE ASSEMBLY

*(Received the assent of the Governor-General on the  
27th March, 1921)**An Act to amend the Law relating  
to the Calcutta University*

Whereas it is expedient to amend  
the law relating to the Calcutta  
University;

It is hereby enacted as follows :

1. This Act may be called the  
Calcutta University  
Short Title. Act, 1921.

2. In Section 4 of the Calcutta  
University Act,  
Amendment of 1857, (hereinafter  
Section 4, Act referred to as the  
II of 1857. said Act), for the  
words " Governor-General of  
India," the words " Governor of  
the Presidency of Fort William in  
Bengal " shall be substituted.

3. In Sections 5, 7 and 15 of the  
said Act, for the  
Amendment of words " Gover-  
Sections 5, 7 nor-General of  
and 15, Act India in Council "  
II of 1857. in all places where  
they occur, the words " Local  
Government of Bengal " shall be  
substituted.

4. The Sections of Indian Uni-  
versities Act,  
VIII of 1904. 1904, which are  
Repeal. specified in the  
first column of the  
Schedule, are hereby repealed to  
the extent specified in the second  
column thereof.

## THE SCHEDULE

(SEE SECTION 4)

1	2
Sec.	Extent of repeal
2	In clause (b) of sub- section (2), the words " in relation to the University of Cal- cutta the Governor- General in Council, and in relation to the other Universities."
4	Clause (b) of sub- section (1)—the whole—and in sub- section (3) the words " or in the case of the University of Cal- cutta, upon the Chancellor, Rector, Vice-Chancellor and Fellows in their cor- porate capacity."
5	In Sub-section (2), the words " in the Gazette of India or " and the words " as , the case may be."
28	The whole.

## (SECTION 5 OF INDIAN UNIVERSITIES ACT, 1904)

## FIRST SCHEDULE

*Ex-officio* FELLOWS OF THE UNIVERSITY*The University of Calcutta*

In supersession of all previous notifications on the subject, the Government of Bengal (Ministry of Education) is pleased to appoint the following to be *ex-officio* Fellows of the University of Calcutta under Section 5, sub-section (2) of the Indian Universities Act, 1904 (VIII of 1904), as amended by Act VII of 1921 :—

His Excellency the Governor of Assam, Shillong.

The Chief Justice of the High Court of Judicature at Fort William in Bengal.

Lord Bishop of Calcutta and Metropolitan of India.

The Member of the Council of the Governor-General in charge of the Department of Education.

The Member of the Executive Council of the Government of Bengal or the Minister appointed by the Governor to be in charge of the Department of Education.

The Minister for Education, Assam.

The Secretary to the Government of Bengal, Education Department.

The Director of Public Instruction, Bengal.

The Director of Public Instruction, Assam.

The Principal, Presidency College, Calcutta.

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The First Schedule (*Ex-officio* Fellows of the University) under Section 5, Sub-section (2) of the Indian Universities Act 1904 (VIII of 1904) as amended by Act VII of 1921 was *replaced* as follows by Notification No. 378 (Edn.) from the Government of West Bengal, Education Department :

### NOTIFICATION

In exercise of the power conferred by Section 5, Sub-section (2) of the Indian Universities Act, 1904 (VIII of 1904), and in supersession of all previous notifications, the Governor of West Bengal is pleased to appoint the following to be *ex-officio* Fellows of the University of Calcutta :—

- (1) Lord Bishop of Calcutta and Metropolitan of India, Calcutta.
  - (2) The Chief Justice of the High Court of Judicature at Fort William in West Bengal, Calcutta.
  - (3) The Hon'ble Minister in the Ministry of Education, Government of India, New Delhi.
  - (4) The Hon'ble Premier, West Bengal.
  - (5) The Hon'ble Minister appointed by the Governor, in charge of the Department of Education, West Bengal, Calcutta.
  - (6) The Hon'ble Minister appointed by the Governor, in charge of the Finance Department, West Bengal, Calcutta.
  - (7) The Secretary to the Government of West Bengal, Department of Education, Calcutta.
  - (8) The Director of Public Instruction, West Bengal, Calcutta.
  - (9) The Principal, Presidency College, Calcutta.
-

No. F. 55-i(vi)38-E

## GOVERNMENT OF INDIA

DEPARTMENT OF EDUCATION, HEALTH AND LANDS

*New Delhi, the 7th April, 1938*

## NOTIFICATION

(EDUCATION)

In exercise of the powers conferred by sub-section (1) of section 124 of the Government of India Act, 1935, the Central Government is pleased, with effect from the 1st day of April, 1938, to entrust to the Provincial Government of Bengal, with their consent, the functions of the Central Government under the provisions specified in the first column of the Schedule, subject to such condition, if any, as is specified in respect of functions under any of said provisions in the corresponding entry in the second column of the said schedule.

## SCHEDULE

1 Provisions under which functions entrusted	2 Condition subject to which func- tions entrusted
Enactment	Section
The Calcutta University Act, 1857 (II of 1857)	5 7
	The Provincial Government shall not exercise the power to cancel the appointment of Fellows save with the concurrence of the Chancellor.
The Indian Universities Act, 1904 (VIII of 1904).	15 Sub-sections (3) & (4) of Section 21
	22 The Provincial Government of Bengal shall not pass orders save with the concurrence of the Government of the province wherein the college concerned is situated. In the event of disagreement between the two Governments, the matter shall be referred to the Central Government for orders.
	Sub-sections (5) & (6) of Section 24
	Sub-section (1) of Section 25

G. S. BAJPAI,  
*Secretary.*

# NEW REGULATIONS

## CHAPTER I

### THE SENATE

1. The Senate shall meet ordinarily once a year in the month of January and may meet at other times if convened by the Vice-Chancellor, or, in his absence from Calcutta, or when the office of Vice-Chancellor is vacant, by the Senior Ordinary Fellows present in Calcutta.

2. The *ex-officio* Fellows of the University are always the Senior Fellows in order of official precedence. The seniority of all Ordinary Fellows is according to the date and order of their first appointment under the Indian Universities Act, 1904.

3. The Vice-Chancellor, or, in his absence, or when the office of Vice-Chancellor is vacant, the Senior Ordinary Fellow present in Calcutta shall convene a meeting of the Senate on the requisition of any six Fellows.

4. No question shall be brought under the consideration of the Senate which has not first been considered by the Syndicate.

5. Except in the case of urgent business, twelve clear days' notice shall be given of every meeting.

6. The Registrar shall, with notice, issue an agenda paper showing the business to be brought before the meeting, the terms of all resolutions to be proposed of which notice in writing has previously reached him, and the names of the proposers. Notices in writing of additional resolutions and of proposed amendments and the terms thereof should reach the Registrar four clear days before the day of such meeting.

7. The Registrar shall also two clear days before the day of meeting, forward to each member of the Senate an agenda paper showing all the motions and amendments and any additional business proposed by the Syndicate; and no motion and, unless expressly sanctioned by a majority of the members present, no amendment, of which such notice has not been given, shall be put to the meeting, other than a motion for any change in the order of business, a motion for dissolution, or adjournment, or for putting the question to vote, or for passing to the next business on the agenda paper, or for directing the Syndicate to review their decision or an amendment which may be accepted

by the Chairman as merely formal. The adjournment of a debate may, however, be moved for the purpose of giving notice of an amendment which has been disallowed.

8. Fifteen members of the Senate shall constitute a quorum, and all questions shall be decided by a majority of the votes of the members present.

9. The Chancellor, or, in his absence, the Vice-Chancellor, shall preside at meetings of the Senate, or, if the Vice-Chancellor be not present, a Chairman for the occasion shall be elected by the members present. If the votes, including that of the Chairman, are equally divided, the Chairman shall have a casting vote.

#### ORDER OF BUSINESS

10. At the time appointed for the meeting, the Registrar shall take notice whether a quorum is present. If there is not, and if a quorum is not present within fifteen minutes, no meeting shall be held.

11. If at any time during the progress of business, any member shall call attention to the fact that there is not a quorum present, the meeting shall forthwith be dissolved. Such dissolutions shall be recorded by the Registrar under the signature of the Chairman.

12. At every meeting the business shall be taken in the following order :

- (i) The election, if necessary, of the Chairman.
- (ii) University appointments.
- (iii) Any motion for a change in the order of business.
- (iv) Matters brought forward by the Syndicate.
- (v) Other business.

#### RULES OF DEBATE

##### (i) *Motions*

13. Every motion shall be affirmative in form, and shall begin with the word 'that'.

14. Every motion at a meeting must be seconded ; otherwise it shall drop.

15. When a motion has been seconded, it shall be stated from the Chair unless it be ruled out of order.

16. When the motion has been thus stated, it may be discussed as a question to be resolved either in the affirmative or

in the negative, or as proposed to be varied by way of amendment. When no Fellow rises to speak to the motion, the Chairman shall proceed to put the question to the vote in the manner hereinafter mentioned.

17. Not more than one motion and one amendment thereto shall be placed before the meeting at the same time.

18. A motion once disposed of shall not be again brought forward at the same meeting, or at any adjournment thereof. A motion substantially identical in part with one already disposed of may be brought forward with the omission of such part.

### (ii) *Amendments*

19. Any proposal before the meeting may be amended (a) by leaving out a word or words; (b) by leaving out a word or words in order to add or insert some other word or words; (c) by adding or inserting a word or words.

When the amendment is of the first kind, the form in which it will be proposed and handed to the Chair will be, "That the words (mentioning them) be left out of the question."

When the amendment is of the second kind, the form will be, "That the words (mentioning them) be left out of the question, in order to add (or insert) the words (mentioning them)."

When the amendment is of the third kind, the form will be, "That the words (mentioning them) be added (or inserted)."

20. No amendment shall be proposed which would in effect constitute a direct negative to the original motion, or which would alter the first word.

21. Every amendment must be relevant to the motion upon which it is moved.

22. No amendment shall be proposed which substantially raises a question already disposed of by the meeting, or which is inconsistent with any resolution already passed by it.

23. An amendment, the substance of which has been disposed of in part, may be modified by its proposer so as to retain only the part not so disposed of.

24. The order in which amendments of which previous notice has been given are to be brought forward shall be determined by the Chairman.

25. An amendment must be seconded in the same way as a motion; otherwise it shall drop. A seconder of an amendment may reserve his speech with the permission of the Chairman.

26. When an amendment has been moved and seconded it shall, unless ruled out of order, be stated from the Chair and



then the debate may proceed on the original motion and the amendment together.

27. When the Chairman has ascertained that no other Fellow entitled to address the meeting desires to speak, the mover of the original resolutions may reply upon the whole debate. But the mover of an amendment, or of a motion for dissolution or adjournment, or of a motion to pass to the next business on the agenda paper has no right of reply.

28. No Fellow shall speak to the question after the mover has entered on his reply.

29. When the debate is concluded the Chairman shall after summing up, if he so desires, put the question to the vote thus :

If there is no amendment, the Chairman shall say, "The question is " and state the motion, and shall then take the votes of the meeting.

If there is an amendment, the Chairman shall say, "It has been moved " and shall state the motion ; then he shall say, "Since which it has been moved by way of amendment"

- (a) "that the following word or words be omitted" (if the amendment is one of the first kind) ;
- or (b) "that the following word or words be omitted, and that the following word or words be added or inserted," indicating where such words are to be added or inserted (if the amendment is of the second kind) ;
- or (c) "that the following word or words be added or inserted," mentioning where such word or words are proposed to be added or inserted (if the amendment is of the third kind).

The votes of the members present in the meeting shall then be taken on the amendment by a show of hands.

29A. After a motion or amendment thereto has been moved and seconded, a motion 'That the question be now put' may be moved at any time as a distinct question but not as an amendment, nor so as to interrupt a speech.

29B. After a member has moved 'That the question be now put' the motion 'That the question be now put' shall be put to the vote forthwith and decided without amendment or debate, unless it shall appear to the Chairman that such a motion is an infringement of the rights of reasonable debate.

29C. When the motion 'That the question be now put' has been carried, the motion or amendment, the debate on which has thus been terminated, shall be put and decided without amendment or further debate.

30. If an amendment is negatived, the original motion shall be again stated from the Chair, and subject to the foregoing Regulations, any other amendment which is in order may then be proposed thereto.

31. If an amendment is carried, the motion as amended shall be stated from the Chair, and may then be debated as a substantive question, to which the further amendments to the original motion which are in order and so far as they shall be applicable may be proposed, subject to the foregoing Regulations, and such further amendments shall be disposed of in the same manner as the original amendment.

### (iii) *Adjournments*

32. A motion "That this meeting be now dissolved" or "That this meeting be now adjourned to (some specified date and hour)" may be moved at any time as a distinct question, but not as an amendment, nor so as to interrupt a speech. If a motion for dissolution is carried, the business before the meeting shall drop. If a motion for adjournment is carried, the meeting shall be adjourned, and the business shall be resumed at the adjourned meeting.

33. A motion "That the debate be now adjourned to (some specified date and hour)" may be moved in the like manner, and if it be carried shall have the effect of postponing the debate on the question under consideration till the date and hour specified and the other items on the agenda paper shall be proceeded with. If the motion be negative, the debate shall be resumed.

34. No amendment shall be moved to a motion under either of the two last preceding Regulations, except one for substituting a different date and hour for that to which it is proposed to adjourn the meeting or debate, or a motion under Regulation 36.

35. A meeting or a debate renewed or continued after an adjournment is to be deemed one with that preceding the adjournment.

36. A motion "That the meeting pass to the next business on the agenda paper" may be made at any time, in like manner and subject to the same rules as one for adjournment. If such a motion be carried, the motion under consideration and the amendments thereon, if any, shall drop.

37. No motion for the dissolution or for the adjournment of the meeting, or for the adjournment of the debate, or to pass to the next business, shall except by leave of the meeting, be moved or seconded by any Fellow who has spoken to the question then before the meeting, or who, during the discussion of such

question, has already made one of the aforesaid motions. Any such motion shall take precedence of any question that may be before the meeting, and, if not withdrawn, must be disposed of before such question.

38. When a motion of the class contemplated in the last preceding Regulation has been brought forward and negatived, no other motion of that class shall be brought forward until after the lapse of what the Chairman shall deem a reasonable time; nor shall a debate be allowed on such second or subsequent motion except with the permission of the Chairman.

(iv) *Miscellaneous*

39. The Fellow, who first rises to speak at the conclusion of a speech, has the right to be heard. When two or more Fellows rise to speak at the same time, the Chairman shall decide who shall speak first.

40. Except as hereinafter provided, a Fellow, who has spoken to a motion or amendment, is not at liberty to speak again to such motion or amendment.

41. In so far as the question raised by an amendment is one on which he has not yet spoken, any Fellow may speak to that question, though he has spoken to the original question or a previous amendment.

42. No Fellow, except with the permission of the meeting, shall speak for more than fifteen minutes when proposing a motion or amendment, or for more than ten minutes when seconding or speaking to a motion or amendment, or when replying.

43. It shall be open to the Senate under special circumstances and by a special vote to reduce the time limits specified in Regulation 42.

44. The Chairman may, at any stage in the proceedings, at his own discretion or at the request of a Fellow, explain the scope and effect of the motion or amendment which is before the meeting. He may also at the conclusion of a debate, sum up the debate if he so desires.

45. Proposals relating to the conferring of Honorary Degrees, Votes of Thanks, Messages of Congratulation or Condolence, Addresses, and other matters of a like nature, may be moved from the Chair.

46. If the Chairman desires to take an active part in a debate he shall vacate the Chair until the vote on that debate shall have been taken. During such time the Chair shall be taken by the Senior Fellow present who has not already taken part

in the debate and who waives his right to do so. The acting Chairman shall during the debate in question exercise all the ordinary rights of the Chairman.

47. Any Fellow may, with the permission of the Chairman, rise even while another is speaking, to explain any expression used by himself which may have been misunderstood by the speaker, but he shall confine himself strictly to such explanation.

48. Any Fellow may call the Chairman's attention to a point of order even while another Fellow is addressing the meeting, but no speech shall be made on such point of order.

49. The Chairman shall be the sole judge on any point of order, and may call any Fellow to order, and may, if necessary, dissolve the meeting.

50. No motion or amendment shall be withdrawn from the decision of the meeting without its unanimous consent, but the consent shall be presumed if the mover states his wish to withdraw the motion or amendment, and the Chairman, after an interval during which no dissent is expressed, announces that it is withdrawn.

51. Any motion or amendment, standing in the name of a member who is absent from a meeting, or who declines to move it, may be brought forward by any other member.

#### *(v) Voting*

52. On putting any question to the vote, the Chairman shall call for an indication of the opinion of the Senate by a show of hands in the affirmative and negative, and shall declare the result thereof according to his opinion.

53. Any six Fellows may then demand a division, except on a motion of the kind contemplated in Regulations 29A, 32, 33, and 36.

54. The Chairman shall thereupon give such directions for effecting the division as he shall consider expedient. The names of the gentlemen who vote for or against the motion, or decline to vote, shall be recorded.

55. If no division is demanded, any Fellow shall have the right to dissent and to have the fact of his dissent recorded, provided such dissent be announced as soon as the Chairman shall have declared the result of the voting.

#### COMMITTEES

56. The Senate may, when it thinks fit, appoint a committee consisting of any number of its members, or it may

resolve itself into a committee for the consideration of business duly brought before it.

57. A motion for the appointment of a committee, or for the resolution of the meeting into a committee, may be made by any member at any time, and without the notice required by Regulation 5.

58. A motion for the appointment of a committee must define the purpose for which the committee is to serve and the number of members to compose it. Amendments for enlarging or restricting the operations of a committee or for enlarging or restricting the number, may be made without previous notice. If the motion is carried, the member moving shall name the persons whom he wishes to form the committee. Amendments may be made proposing other names. A ballot shall then be taken, if necessary, and the requisite number appointed from those who obtain the largest number of votes.

59. The quorum for a committee of the whole Senate shall be the same as that provided for the meetings of the Senate; the quorum for a committee appointed by the Senate shall be determined at the time of appointment and shall be not less than a majority of the members appointed.

60. The Chairman of a committee of the whole Senate shall be the same as for a meeting of the Senate; the Chairman of a committee appointed by the Senate shall be appointed by the Senate at the time of the appointment of the committee.

In committee the proceedings shall be governed by the Regulations framed for debate, which, however, may be relaxed at the discretion of the Chairman.

61. The resolutions passed by the Senate in committee shall be embodied in a report prepared by the Registrar and signed by the Chairman, but shall not become final until they have been confirmed by the Senate at a subsequent meeting.

62. The resolutions of a committee appointed by the Senate shall be embodied in a report prepared by the Registrar or by a member of the committee, which report shall be laid before the committee for adoption or amendment. The report duly signed by the members of the committee, with notes of dissent, if any, shall be presented to the Senate at its next meeting, subject to the provisions of Regulation 5 respecting notice.

### ELECTIONS

63. In all cases of election, other than those specially provided for, the candidates shall be proposed and seconded. If no more candidates are nominated than there are vacancies to be

filled, the Chairman shall declare those candidates to be elected. If the number of candidates exceeds the number of vacancies, a vote shall be taken by ballot.

64. In the case of a single appointment, a ballot shall be taken, in which each Fellow shall only be entitled to give one vote, and the candidate or candidates receiving the smallest number of votes shall be withdrawn. Another ballot between the remaining candidates shall then be taken, and this procedure shall continue until the number of candidates is reduced to two. There shall then be a final ballot, and the candidate receiving the higher number of votes shall be considered to be duly elected. Provided that if at any stage of the ballot a candidate obtains an absolute majority of votes, the ballot shall cease.

If in any ballot, owing to an equality of votes, all the candidates but one would be eliminated by this procedure, a fresh ballot shall be taken, and if a similar equality again occurs, the Chairman shall give a casting vote.

If in any ballot there is an equality of votes among all the candidates, a fresh ballot shall be taken. If the equality be not removed, the Chairman shall give a casting vote, and the candidate receiving this vote shall be regarded as duly elected; with this exception, it shall be a necessary and sufficient condition for election that a candidate obtains an absolute majority of votes: and should this occur at any stage, the ballot shall cease.

65. In all cases of contested election for two or more appointments, each Fellow shall be entitled to give as many votes as there are appointments to be filled, but shall not give more than one vote for one person. The candidates who obtain the largest number of votes shall be elected, except when by reason of equality of votes the number of such candidates is in excess of the number of appointments to be filled; in this case a fresh ballot shall be taken among those whose equality of votes has caused such excess. If the result of this ballot leaves the matter still undecided as to one or more of the appointments, the Chairman may decide who among the candidates found equal on the second ballot shall be appointed, or the Chairman may, at his discretion, give such directions for further ballot as the circumstances of the case may justify.

#### PROTESTS

66. Any member of the Senate intending to protest against a resolution of the Senate shall give notice of his intention to the Registrar within a week from the date of the issue of the minutes of the meeting at which the Resolution was passed, and within one week thereafter lodge his protest with the Registrar.

The Registrar shall thereupon forward the protest to the Chairman of the meeting and request him to nominate three Fellows to form a committee to prepare a Memorandum in support of the Resolution and the committee so nominated shall frame the Memorandum accordingly. The Registrar shall then cause the protest and Memorandum to be printed and circulated to each member of the Senate; they shall also be laid on the table at the next meeting of the Senate, and recorded in the Minutes thereof.

If the protest relates to a matter, the final decision of which rests with the Chancellor or with the Local Government of Bengal, the Registrar shall further submit the protest and Memorandum, together with a copy of the Resolution, to the Chancellor or to the Local Government of Bengal, as the case may be, for his consideration and orders.

If a protest has been lodged with the Registrar with reference to a Resolution which requires the confirmation of the Chancellor or of the Local Government of Bengal, the Resolution shall not be sent up for confirmation except with the Protest and the Memorandum.

#### RECONSIDERATION

67. No matter which has been decided by the Senate shall, within a period of twelve months, be reconsidered, except—

At a special meeting of the Senate convened for the purpose upon the requisition of six Fellows.

And unless three-fourths of the members present at such meeting vote in favour of a reconsideration.

#### MINUTES

68. Within two weeks after a meeting of the Senate, a draft of the Minutes of such meeting shall be submitted to the Chairman and attested by him. The Minutes shall then be printed and circulated to all members of the Senate, and such of them as were present shall, within a fortnight of the issue of the Minutes, communicate to the Registrar any exceptions they may take to the correctness thereof. The Minutes and the exceptions taken, if any, shall be laid before the next meeting of the Senate, and the Minutes in their final form shall then be confirmed. Once every twelve months, or at such other intervals as the Senate shall direct, the Syndicate shall cause the Minutes of the meetings of the Senate to be printed, and a copy thereof to be forwarded to each Fellow.

## GENERAL

69. In any case not provided for by these Regulations, the Chairman shall give a ruling as to procedure on the principles already laid down.

70. Representatives of the Press and visitors may be admitted to meetings of the Senate, provided they have obtained the permission of the Registrar.

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## CHAPTER II

### VACANCIES ON THE SENATE

1. In the first week of December, 1907, 1908, 1909, 1910, on such dates as may be determined by the Vice-Chancellor or the senior Ordinary Fellow, as the case may be, a ballot shall be taken at the Senate House, with a view to determining who among the three classes of Ordinary Fellows mentioned in Section 12, clause (l) of the Indian Universities Act VIII of 1904, Act should retire. The ballot shall be taken by the Registrar in the presence of the Vice-Chancellor or the senior Ordinary Fellow, as the case may be. Every Ordinary Fellow shall be duly informed of the date and hour and may, if he so desires, be present at the ballot. The Registrar shall forthwith intimate to the Chancellor the names of the retiring Fellows so determined.

The transaction of University business, which is neither formal nor urgent shall, as far as practicable, be avoided, till the vacancies thus caused are filled up, or intimation is received that they will not be filled up.

2. A register shall be kept by the Registrar of the date of appointment of every Ordinary Fellow, and of the date when he will cease to be a Fellow, under Section 4, clause (2) of Section 12, clause (n) of the Indian Universities Act. Not less than six weeks before the date of every approaching vacancy in a Fellowship, the Registrar shall intimate the fact to the Chancellor.

3. A register shall be kept of the attendance of every Ordinary Fellow at meetings of the Senate; and whenever it is ascertained that an Ordinary Fellow has not attended any meeting of the Senate, other than a Convocation, during the period of one year, the Registrar shall intimate the fact to the Chancellor with a view to enabling him to take action, if he thinks fit, under Section 11, sub-section (2) of the Indian Universities Act.

4. Except as otherwise provided, whenever the Registrar receives information that a vacancy has occurred on the Senate by reason of the retirement of a Fellow under Section III, Act II of 1857, or by death or resignation or from any other cause, he shall forthwith intimate the fact to the Chancellor.

5. Whenever an Ordinary Fellow ceases to be such from any cause whatever, he shall vacate any University office or appointment held by him in his character as an Ordinary Fellow ; and if he is re-elected or re-appointed a Fellow, he shall not again hold such office or appointment unless he is duly appointed thereto.

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## CHAPTER III

### THE FACULTIES

1. There shall be six Faculties, namely : (1) Arts, (2) Science, (3) Law, (4) Medicine, (5) Engineering and (6) Technology.

A member of the Senate may belong to one or to two of the Faculties, but not to more than two, and need not necessarily belong to any.

2. Appointments to the Faculties shall be made by the Senate at the Annual Meeting. The Syndicate shall, in the first instance, draw up a list of Fellows whom they recommend for appointment to the various Faculties. They shall ordinarily recommend a Fellow for appointment to one Faculty only, but may recommend a Fellow for appointment to two Faculties : Provided that in the latter case Fellows so recommended shall at no time exceed twenty. This list shall be circulated among the members of the Senate by the Registrar not less than sixteen clear days before the meeting. Any member of the Senate may then propose additional names for any of the Faculties, which must be sent to the Registrar nine clear days before the meeting. These names, together with the original list, shall be circulated among the members of the Senate seven clear days before the meeting and no additional names shall be received. The entire list shall be voted on, Faculty by Faculty, and every member shall be declared to be appointed who obtains votes from a majority of the members of the Senate voting for the Faculty under appointment. If any Fellow be appointed to more than two, he must, on receiving intimation, declare to which Faculties he accepts appointment.

3. Between the dates of the Annual Meetings of the Senate the Syndicate shall have power to distribute any newly appointed Fellows to their appropriate Faculties and the Boards of Studies.

4. Each Faculty shall elect its Dean annually from its own member as soon as its members have been appointed.

If any Faculty omits to elect a Dean within one month of the Annual Meeting of the Senate, or if, in the event of the office of Dean being vacated, it fails to elect a new Dean within one month of the occurrence of the vacancy, the Vice-Chancellor may appoint a Dean. The Dean shall always be one of the Fellows belonging to the Faculty.

5. Each Faculty shall have the power to add to its own body a number of Graduates in that Faculty and other persons possessing special knowledge of the subjects of study represented by that Faculty, provided the number of members thus added shall not exceed half the number of Fellows appointed to that Faculty at the Annual Meeting of the Senate and shall in no case exceed ten. A person may belong to more than one Faculty as added member.

6. Such added members shall be elected annually at a special meeting of the Faculty called for the purpose, and the election shall take place in the following manner :—

- (a) The Dean shall as soon as possible after the Annual Meeting of the Senate convene a special meeting for the election of the added members.
- (b) Each Fellow on the Faculty will on receipt of the notice of the meeting be entitled to propose the name of one person for appointment as an added member of the Faculty. Such proposal must be accompanied by a brief written statement of the special qualifications of his nominee, and must reach the Registrar seven clear days before the meeting.
- (c) The Registrar shall cause a list of the nominees and the statements concerning them to be printed and forwarded to the Fellows concerned four clear days before the meeting.
- (d) The voting shall be by ballot, and each Fellow on the Faculty shall be entitled to give one and one vote only for a candidate, but no Fellow shall have more votes than there are appointments to be filled. If the number of nominees does not exceed the limit prescribed by Regulation 5, any candidate, receiving the votes of a majority of the Fellows on the Faculty present at the special meeting (contemplated under the section) and voting shall be held to be duly elected. If the number of nominees exceeds the above limit, those candidates shall be held to be duly elected who have obtained the highest number of votes for the number of appointments admissible, provided that, as before, each such candidate shall have secured the votes of a majority of the Fellows on the Faculty present at the special meeting (contemplated under the section) and voting.

7. All members (including Added Members) shall hold office till the next annual appointment of the Faculty by the Senate.

*Note.*—Subject to the provisions of Section 5, Chapter II of the Regulations, a member of a Faculty shall not cease to be a member of the Board of Studies to which he belongs until the annual constitution of the Board under Sections 3, 4, 5 and 6 of Chapter V of the Regulations.

8. Added members shall have the right to take part in the ordinary business of the Faculty and in any election of an Ordinary Fellow by the Faculty, but shall not be entitled to take part in the election of the Syndicate.

Act VIII of 1904,  
Sec. 14 (3).

9. Every meeting of a Faculty shall be convened by the Dean, or in his absence, or when the office of Dean is vacant, by the senior Ordinary Fellow belonging to the Faculty present in Calcutta.

10. The Dean, or in his absence, or when the office of Dean is vacant, the senior Ordinary Fellow, belonging to the Faculty present in Calcutta, shall convene a meeting of the Faculty on the requisition of any three members.

11. 'Three clear days' notice shall be given of ordinary meetings of the Faculties. In the case of elections of Members of the Syndicate, Fellows, Added Members, and Boards of Studies, fifteen clear days' notice shall be given.

12. The quorum for the Faculty of Arts shall be ten, and for any other Faculty three.

13. Two or more Faculties may be called upon by the Senate or the Syndicate to meet together for the disposal of any questions affecting more than one Faculty. In such cases the joint meeting shall elect its own Chairman.

14. The quorum of a joint Faculty meeting must include a full quorum of each Faculty represented, no member present being counted on more than one separate quorum.

15. It shall be the duty of a Faculty to consider and report on all matters referred to it by the Syndicate or the Senate, and a Faculty shall be at liberty to make recommendations to the Syndicate in all matters relating to the organization of University Examinations, Teaching, and Research in the studies or subjects with which it is concerned, and to propose regulations relating to these matters for the consideration of the Syndicate.

16. All elections shall be conducted in the same manner as those in the Senate, except as otherwise provided.

17. Within two weeks after a meeting of a Faculty, a draft of the Minutes of such meeting shall be submitted to the Chairman

and attested by him. The Minutes shall then be printed and circulated to all members of the Faculty, and such of them as were present shall, within a fortnight of the issue of the Minutes, communicate to the Registrar any exception they may take to the correctness thereof. The Minutes and the exceptions taken, if any, shall be laid before the next meeting of the Faculty, and the Minutes in their final form shall then be confirmed. Once every twelve months, or at such other intervals as the Senate shall direct, the Syndicate shall cause the Minutes of the meetings of each Faculty to be printed and a copy thereof to be forwarded to each member of the Faculty concerned.

18. The rules for debate laid down in the Senate Regulations shall apply to the Faculties as far as is practicable, but the Chairman may relax their operation at his discretion.

19. The Dean shall ordinarily preside at meetings of a Faculty, and in the absence of the Dean the members present shall elect a Chairman.

## CHAPTER IV

### THE SYNDICATE

1. The executive government of the University is vested in the Syndicate, which shall consist of the Vice-Chancellor of the University as Chairman, and the Director of Public Instruction to the Government of Bengal for the time being as *ex-officio* member, and 15 of the *ex-officio* or Ordinary Fellows of the University, who shall be elected for a period of one year, partly by the Senate and partly by the Faculties, as follows :—

Four by the Senate.  
Four by the Faculty of Arts.  
Two by the Faculty of Science.  
Two by the Faculty of Law.  
Two by the Faculty of Medicine.  
One by the Faculty of Engineering.

The Syndics elected by any Faculty must be Fellows belonging to that Faculty.

2. The election by the Faculties shall take place at special meetings not less than three weeks before the Annual Meeting of the Senate. Notice of such meetings shall be issued by the Registrar, not less than fifteen clear days before the appointed date. Each Fellow on the Faculty will, on receipt of the notice, be entitled to propose the name of one person for appointment as member of the Syndicate. Such proposal must reach the Registrar seven clear days before the meeting. The Registrar shall cause a list of the nominees to be printed and forwarded to the Fellows concerned four clear days before the meeting. In any contested election the voting shall be by ballot and the procedure shall be the same as that laid down in paragraphs 63-65 of the Senate Regulations. As soon as members have been elected by any Faculty, their names shall be notified by the Registrar to all members of the Senate.

3. The election by the Senate shall take place at the Annual Meeting. Not less than seven days before the meeting the names of members who are proposed by any Fellows for election shall be submitted in writing to the Registrar, who shall circulate the names to the members of the Senate at least four clear days before the meeting.

4. Of the fifteen members of the Syndicate so elected at least seven shall be either Heads of, or Professors in, Colleges affiliated to the University, and of these Syndics at least two shall be elected by the Senate and at least five by the various Faculties :—

Three by the Faculty of Arts.  
One by the Faculty of Science.  
One by the Faculty of Medicine.

In any meeting for election such Syndics to the stated minimum number shall be elected first.

Fellows qualified for election under this Regulation are not debarred from election to the remaining places on the Syndicate.

*Explanation.*—A person who has been elected to a seat reserved for Heads of, or Professors in, Colleges affiliated to the University, shall, as soon as he ceases to be such Head or Professor, be deemed to have vacated his seat, and the electorate concerned shall proceed to fill up the vacancy by the election of a person possessing the necessary qualification.

5. If in the case of any election of a Fellow to the Syndicate the question is raised whether any person so elected is or is not a Professor within Section 15, sub-section (2) of the Indian Universities Act, the question shall be decided by the Senate.

6. The Syndicate shall meet ordinarily once a month, and at other times when convened by the Vice-Chancellor, or in his absence from Calcutta, or when the office of Vice-Chancellor should happen to be vacant, by the senior member of the Syndicate present in Calcutta. Whenever an emergency arises and there is not time to summon a meeting of the Syndicate, the Vice-Chancellor may take such immediate action as he deems necessary. The nature of the emergency and the action taken to meet it shall be reported by the Registrar at the next meeting of the Syndicate.

7. The Syndicate shall have power to appoint committees from among its own members, and to add to such committees any Ordinary Fellow of the University and any added member of a Faculty. The reports of such committees must be considered by the Syndicate as a whole before being published or acted upon.

8. All members of the Syndicate must ordinarily be resident in or near Calcutta. If any member is temporarily absent from his residence, the Vice-Chancellor or the Dean of his Faculty, as the case may be, may appoint a member of possessing the necessary qualifications to officiate during his absence. Should the period of absence exceed three months, the Vice-Chancellor may declare his place vacant.



9. On every vacancy in the Syndicate caused by death or resignation, or otherwise, the Senate or the Faculty, as the case may be, shall proceed to elect a new member for the remainder of the term for which the original member had been elected.

10. If the Senate or the Faculty omits to elect a member of the Syndicate within one month after a vacancy occurs, the Vice-Chancellor may appoint a person possessing the necessary qualifications.

11. Seven members of the Syndicate shall constitute a quorum, and all questions shall be decided by a majority of the votes of the members present. The Vice-Chancellor, or, in his absence, the senior Fellow present, shall preside at all meeting of the Syndicate, and if the votes, including that of the President, are equally divided, the President shall have a casting vote.

12. It shall be the duty of the Syndicate to consider and report upon matters to be submitted to the Senate ; to appoint, and if necessary to remove, the Examiners and all other officers of the University in regard to whom this power is conferred by the Regulations ; to make rules for the conduct of examinations in conformity with the Regulations and to fix the time at which they shall be held ; to recommend to the Senate the grant of degrees, honours and rewards ; to administer the funds and to keep the accounts of the University ; to correspond on the business of the University with the Government and all other authorities and persons ; and generally, to conduct the affairs of the University in accordance with the Act of Incorporation and the Indian Universities Act, the Regulations, and the Resolutions of the Senate and the Syndicate.

13. The Syndicate may from time to time recommend to the Senate such Regulations as may seem desirable.

14. Each Faculty shall report on any subject that may be referred to it by the Syndicate. Any Faculty, or any member or number of members of the Senate, may make any recommendation to the Syndicate and may propose any Regulation for the consideration of the Syndicate.

15. The decision of the Syndicate on any such recommendation or proposition, or on any matter whatever, may be brought before the Senate by any member of the Senate at one of its meetings, and the Senate may approve, revise, or modify any such decision or may direct the Syndicate to review it : Provided that no matter directly concerning any particular Faculty shall be disposed by the Syndicate or the Senate without having been referred to that Faculty for opinion.

16. All questions as to affiliation or disaffiliation of Colleges or the continuation of affiliation granted to Colleges or to the

courses of instruction which such Colleges will be allowed to adopt for the purposes of University examinations or to the inspection of and report on the condition of Colleges, shall be dealt with by the Syndicate in accordance with Sections 20, 21, 22, 23 and 24 of the Indian Universities Act.

17. All questions as to the recognition of or on the withdrawal of recognition from, or the conditions required for the continuance of recognition of, schools shall be dealt with by the Syndicate under the Regulations prepared under Section 25 (2) (c) of the Indian Universities Act.

18. Whenever practicable, the Syndicate may, with the sanction of the Senate and from the funds of the University or any other funds placed at the disposal of the University for the purpose, institute scholarships for post-graduate study or studentships for research in literary or scientific subjects. The conditions governing their award and tenure shall be laid down from time to time by the Senate.

19. With a view to encourage research in vernacular literatures and languages, and foster their growth, the Syndicate may, with the sanction of the Senate, provide grants, prizes or scholarships for—

- (a) critical editions of early vernacular text ;
- (b) historical investigations of the origins of vernacular literatures and their early development ;
- (c) philological investigations of Indian vernaculars and their dialects.

20. The Minutes of the Syndicate, having been duly confirmed, shall be printed and circulated at once to the members of the Senate.

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## CHAPTER V

### BOARDS OF STUDIES

1. There shall be Boards of Studies in the following branches of knowledge :—

- (1) English.
- (2) Greek, Latin, French, German and Armenian.
- (3) Sanskrit.
- (4) Sanskritic Languages.
- (5) Hebrew.
- (6) Arabic, Persian and Urdu.
- (7) History.
- (8) Economics and Political Philosophy.
- (9) Mental and Moral Philosophy.
- (10) Chemistry.
- (11) Experimental and Mathematical Physics.
- (12) Zoology.
- (13) Geology and Mineralogy.
- (14) Botany.
- (15) Physiology.
- (16) Anthropology.
- (17) Psychology.
- (18) Mathematics.
- (19) Geography.
- (20) Teaching.
- (21) Law.
- (22) Medicine.
- (23) Engineering.
- (24) Textile Technology.
- (25) Leather Technology.
- (26) Jute Technology and such other Board or Boards which may be added by the Senate from time to time.

The Boards shall be respectively appointed by the Faculties as follows :—

Boards 1-9 shall be appointed by the Faculty of Arts.

Boards 10-15 shall be appointed by the Faculty of Science.

Boards 16-20 shall be appointed by the Faculties of Arts and Science.

Board 21 shall be appointed by the Faculty of Law.

Board 22 shall be appointed by the Faculty of Medicine.

Board 23 shall be appointed by the Faculty of Engineering.

Boards 24-26 shall be appointed by the Faculty of Technology.

2. The members of a Board shall be teachers of, or examiners in, or other persons who have a special knowledge of the subject or subjects with which the Board is concerned.

3. No fewer than three and not more than twelve members of a Board shall be appointed by the Faculties.

4. The members of the respective Boards, up to a maximum of twelve, shall be appointed by the Faculty or Faculties as provided in Regulation 1 from among their own members (including added members). The different Boards of Studies thus formed shall have the power to co-opt three additional members all of whom must be teachers of, or specialists in, subject or subjects with which the Board is concerned. No member shall belong to more than seven Boards.

Where a Board as constituted under the above Regulations does not contain at least 33 per cent. of members who are also members of the relevant Board of Higher Studies such a number of members shall be co-opted from the Board of Higher Studies as will bring the percentage as near as possible to 33.

4A. Notwithstanding anything contained hereinbefore a *Board of Studies in Commerce* shall be composed of—

(a) Four members to be elected by the Faculty of Arts from among the members of the Faculty (including the Added Members).

(b) Three members to be elected by the Board of Higher Studies in Commerce from among the members of the Board.

(c) Five members to be nominated by the Syndicate. The members so nominated must be persons connected with Commerce or Commercial studies.

The Board thus constituted shall have power to co-opt not more than three additional members who must be teachers of or specialists in a subject or subjects with which the Board is concerned.

No member of the Board shall belong to more than seven Boards.

5. The Board of Studies shall be elected annually at a special meeting of the Faculty called for the purpose, and the election shall take place in the following manner :—

(a) The Dean of each Faculty shall, as soon as possible after the election of the added members, convene a special meeting for the appointment of the Boards.

(b) Each Member of a Faculty will, on receipt of a notice of the meeting, be entitled to propose not more than twelve members of the same Faculty for appointment to each of the Boards under that Faculty. The list of members proposed by him must reach the Registrar seven clear days before the meeting.

(c) The Registrar shall cause a list of the nominees to be printed and forwarded to the Fellows concerned, four clear days before the meeting.

(d) In any contested election the voting shall be by ballot and the procedure laid down in the Senate Regulations 63-65 shall be followed.

6. Where two or more Faculties have to appoint a Board they shall appoint the members thereof in the proportion assigned to them by the Syndicate previous to such appointment.

6A. Members of a Board (including co-opted members) shall hold office till the next annual constitution of the Board as hereinbefore provided. They shall be eligible for re-appointment.

7. Each Board shall elect its own President. Every meeting of a Board shall be convened by its President or, in his absence, by the senior Fellow belonging to that Board. Three members shall constitute a quorum. The President of a Board, or in his absence, the senior Fellow belonging to the Board, shall convene a special meeting of the Board on the requisition of two or more members of the Board.

8. The duties of each Board shall be—

- (i) to recommend to the Syndicate courses of study for the various examinations of the University in the subject with which the Board is concerned ;
- (ii) to recommend to the Syndicate, for the guidance of teachers and students, books in which the prescribed subjects are suitably treated ; and to recommend text-books when such are required : Provided that no book or text-book shall be recommended by a Board unless on the written report of some competent person who has read it, which report shall be forwarded to the Syndicate ;
- (iii) to consider at the request of the Syndicate, the reports of the Examiners in the subjects with which the Board is concerned, and to frame such recommendations regarding methods of teaching, study and examination as may seem necessary in the interests of education ;
- (iv) to furnish the Syndicate with the names of persons competent to act as Examiners in the subjects with which the Board is concerned ; and
- (v) to consider and report upon all such matters as may be referred to it by the Syndicate, the Faculties by which its members are appointed, or the Senate.

9. Two or more Boards may be called upon by the Syndicate or the Senate to meet together for the disposal of any questions affecting more than one Board. In such cases the joint meeting shall elect its own President. The quorum of a joint Board meeting must include a full quorum of each Board represented, no member present being counted on more than one separate quorum.

10. All meetings of the Boards shall be convened through the Registrar, who will keep a record of the proceedings of the meeting.

11. Meetings of Boards shall be presided over by the President of the Board ; in the absence of the President, the members present shall elect a Chairman.

## CHAPTER VI

### UNIVERSITY FINANCE COMMITTEE

(I) A University Finance Committee shall be appointed annually to deal with the finances of the University in all its departments, consisting of the following members :—

(1) The Vice-Chancellor.

(2) The Director of Public Instruction, Bengal, or a representative of the Education Department of the Government of Bengal to be nominated for the year by the Syndicate after consultation with the Director of Public Instruction, Bengal.

(3) The President, Council of Post-Graduate Teaching in Arts, or a representative of the Council to be nominated by the Executive Committee.

(4) The President, Council of Post-Graduate Teaching in Science, or a representative of the Council to be nominated by the Executive Committee.

(5) One representative to be nominated by the Syndicate.

(6) One representative to be nominated by the Governing Body of the University Law College.

(7) & (8) Two representatives to be nominated by the Senate.

If the same person holds more than one office under (1), (3) and (4) above, the Senate shall give necessary directions for appointment of a substitute member or members.

The Committee shall co-opt a member representing the Governing Bodies or Boards of Management of the Trust Funds of the University.

The Vice-Chancellor shall be the President of the Committee. The Committee shall also elect annually a Vice-President. The Committee shall appoint its own Secretary. Five members shall constitute a quorum.

The duties of the Committee shall be to prepare in its final form the consolidated Budget Estimates of the University in all its departments. In preparing the consolidated Budget

Estimates the Committee shall consider the proposals from various departments including the Budget Estimates prepared by the Post-Graduate Finance Committee for the Teaching Departments and the Budget Estimates of the University Law College prepared by the Governing Body as approved by the Syndicate. The consolidated Budget so prepared shall be submitted by the Committee to the Senate through the Syndicate for adoption.

All proposals involving new expenditure during the year (not covered by Budget grants) shall be placed before the Committee for scrutiny. Such scrutiny by the Committee shall involve consideration of the merits of the said proposals as well as their financial implications. The Committee shall then make its recommendations to the Senate or any other relevant authority. No action will be taken in respect of such proposals by the bodies concerned (except in cases of emergency) until they have been finally sanctioned.

The Committee shall arrange for examination and audit of the University accounts and the accounts of the Endowments and Trust Funds, and shall maintain a watch over the progress of income and expenditure provided for in the Budget.

The Committee shall report upon any matter which may be referred to it by the competent authority for opinion.

The Committee shall frame rules from time to time which shall be subject to sanction of the Senate.

The proceedings of the University Finance Committee shall be subject to confirmation by the Syndicate. In case of difference of opinion the Syndicate shall refer the matter to the Senate for decision.

\* (II) Notwithstanding anything to the contrary contained in the Regulations in particular in this Chapter or in Section 25B, Chapter XI of the Regulations, the Syndicate may, in consultation with the Government, appoint a Board of Accounts consisting of three members who are not members of the Syndicate or Executive Committee of the Post-Graduate Departments of Arts or Science or the Governing Body of the Law College. One of the members who shall be designated Comptroller of Accounts shall receive a salary which will be fixed by the Senate on the recommendation of the Syndicate. The other two members shall not be in receipt of any salary from the University. The members of the Board need not be chosen from amongst Fellows of the University. The Board will elect its own Chairman and the Comptroller will act as its Secretary.

\* Sanctioned by Government Letter No. 3712, dated the 11th August, 1950.

The Board shall function for such period as the Syndicate may determine but not exceeding nine months at a time. During the period the Board functions the University Finance Committee appointed under Para. 1 of this Chapter as well as the Post-Graduate Finance Committee appointed under Section 25B of Chapter XI of the Regulations will cease to function and their authority, functions and duties will during the period be exercised, performed and done by the said Board of Accounts.

The Proceedings of the Board may be brought up for consideration at the Senate either at the instance of the Syndicate or on the recommendation of the Board.

The Board shall submit every three months a report of the work done by it, also of the action taken by the University thereon. Such report shall be placed before the Senate through the Syndicate and a copy of the report shall be forwarded to the Government.

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## CHAPTER VII

### THE REGISTRAR AND OTHER UNIVERSITY OFFICERS

1. The Registrar shall be appointed by the Senate at a Special Meeting to be held for that purpose only. He shall be appointed for five years only or for such shorter term as the Senate may, for special reasons, determine but at the end of every such term he may be re-appointed. The term of office of the Registrar shall commence from such date as may be determined by the Syndicate, unless the Senate otherwise directs. If a vacancy occurs in the office of the Registrar at any time, the Syndicate shall appoint a person to officiate until a permanent appointment is made. Such officiating appointment shall not be made for a period exceeding one year.

2. The Registrar shall be a graduate of position with adequate experience of educational administration preferably in a University. He shall be a whole-time Officer. He may be a Member of the Senate, but shall not be a Member of the Syndicate. His salary shall be in the grade Rs. 800-50-1000 and the Senate shall be competent to make the appointment on a higher initial salary in the grade.

3. The duties of the Registrar shall be as follows :—

- (a) To be custodian of the Records, Library, Common Seal, and such other property of the University as the Syndicate shall commit to his charge.
- (b) To act as Secretary to the Syndicate and to attend all meetings of the Senate, Faculties, Syndicate, Boards of Studies, Boards of Examiners, and any Committees appointed by the Senate, the Faculties, the Syndicate, or any of the Boards, and to keep Minutes thereof.
- (c) To conduct the official correspondence of the Syndicate and the Senate.
- (d) To issue all notices convening meetings of the Senate, Faculties, Syndicate, Boards of Studies, University Finance Committee, Boards of Examiners, and any Committees appointed by the Senate, the Faculties, the Syndicate, or any of the Boards.

- (e) To perform such other work as may be, from time to time, prescribed by the Syndicate, and generally to render such assistance as may be desired by the Vice-Chancellor in the performance of his official duties.

4. Under the Registrar there may be the following branch officers :—

- (1) The Controller of Examinations.
- (2) The Additional Controller of Examinations.
- (3) The Assistant Registrar.
- (4) The Assistant Controller of Examinations.
- (5) The Audit Officer.

#### THE CONTROLLER OF EXAMINATIONS

(i) The Controller of Examinations shall be appointed by the Senate and only at an Annual Meeting. He shall be appointed for five years or for such shorter term as the Senate may, for special reasons, determine but at the end of every such term he may be re-appointed. His salary shall be fixed by the Senate. The term of office of the Controller of Examinations shall commence on the first day of April next following his election. If a vacancy occurs in the office of the Controller of Examinations between two Annual Meetings of the Senate, the Syndicate shall appoint a person to officiate until the first day of April following the next Annual Meeting.

(ii) The Controller of Examinations shall be a graduate of position with experience of University affairs. He shall be a whole-time Officer.

(iii) He shall be responsible for the custody of question papers and shall discharge such other duties as are laid down in rules that may be adopted by the Senate, and perform such other work as may be, from time to time, prescribed by the Syndicate.

(iv) The Additional Controller of Examinations, who shall be a graduate of position with experience of University affairs, shall be appointed by the Senate on the recommendation of the Syndicate on a scale of pay sanctioned by the Senate. He shall be a whole-time Officer. He shall discharge such duties as are laid down in the rules that may be adopted by the Senate from time to time and subject to such rules, perform such other work as may be, from time to time, prescribed by the Syndicate. His immediate official superior will be the Controller of Examinations.

(v) The Assistant Controller of Examinations, who shall be a graduate, shall be appointed by the Syndicate on a scale of pay sanctioned by the Senate. His immediate official superior will be the Additional Controller of Examinations.

## THE ASSISTANT REGISTRAR

The Assistant Registrar, who shall be a graduate, shall be appointed by the Syndicate on a scale of pay sanctioned by the Senate.

## THE AUDIT OFFICER

The Audit Officer, who should have adequate training and experience as an auditor, shall discharge such duties as the Senate may, from time to time, assign to him. He shall be appointed by the Senate on the recommendation of the Syndicate on a scale of pay sanctioned by the Senate. In making the recommendation the Syndicate shall consult the University Finance Committee.

5. SECRETARIES TO THE POST-GRADUATE DEPARTMENTS  
IN ARTS AND SCIENCE

There shall be a salaried and whole-time Secretary to the Council of Post-Graduate Teaching in Arts and its Executive Committee and also a salaried and whole-time Secretary to the Council of Post-Graduate Teaching in Science and its Executive Committee. The Secretary shall discharge such duties as the Executive Committee concerned may decide. He shall be appointed by the relevant Executive Committee subject to confirmation by the Senate.

## GENERAL

6. There shall be a permanent ministerial staff and a permanent staff of servants who shall be appointed according to rules to be laid down by the Senate from time to time and whose number and scale of pay shall be determined by the Syndicate or the Executive authority concerned.

7. It shall be competent to the Syndicate or the Executive authority concerned, to grant, after report from the Audit Officer, to the Registrar and other officers of the University and to the ministerial staff and servants, such leave as may be admissible to them under the rules framed by the Senate from time to time.

8. It shall be competent to the Syndicate or the Executive authority concerned, subject to such modifications as may be rendered necessary by the institution of the Provident Fund, to grant to the Registrar and other Officers of the University and to the subordinate staff and servants a gratuity or pension regulated as follows :—

(a) After a service of less than ten years, a gratuity not exceeding one month's salary for each completed year of service.

(b) After a service of not less than ten years, up to 25 years, a pension not exceeding one-sixtieth of the average salary (*i.e.*, the average calculated upon the last three years of service) multiplied by the number of years of completed service.

The pension shall in no case exceed Rs. 5,000 per annum.

9. In case of misconduct or neglect of duty, the Registrar and other University Officers, *i.e.*, the Controller of Examinations, the Additional Controller of Examinations, the Assistant Registrar, the Audit Officer, the Secretaries, Councils of Post-Graduate Teaching in Arts and in Science, the Assistant Controller of Examinations, shall be liable to suspension by the Syndicate or the Executive Body concerned and to dismissal by the Senate, on the report of that body.

All the other members of the Office staff and servants shall be liable to suspension and to dismissal by the Syndicate or the Executive Body concerned, in case of misconduct or neglect of duty.

10. Officers and Assistants shall ordinarily retire at the age of 55. The appointing body may by a special resolution, where it is in the interests of the University, allow an Officer or an Assistant an extension of service of one year at a time up to his 60th year. In no case should an Officer or Assistant be allowed to remain in service after he is 60 years of age.

11. It shall be competent to the Senate to grant a special allowance to any of the University Officers on any special grounds.

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## CHAPTER VIII

### INSPECTOR OF COLLEGES .

1. For the purpose of inspecting affiliated Colleges a salaried Inspector shall be appointed. The appointment shall be made by the Senate and only at an Annual Meeting, and shall be subject to the approval of Government. He shall be appointed in the first instance for ten years, but at the end of every such term he may be re-appointed. If a vacancy occurs in the office of Inspector, the Syndicate shall appoint a person to officiate until the next Annual Meeting of the Senate.

2. The Inspector of Colleges shall be a person of high academic standing and one possessing some experience of Indian Colleges. He shall be a whole-time Officer of the University. His leave, gratuity or pension shall be on the same terms and conditions as those of the Registrar. His scale of pay shall be Rs. 750-50/2-1,000. He may be a Fellow of the University but must not be a member of the Syndicate. The duties of the Inspector of Colleges shall be—

- (a) to report on Colleges applying for affiliation.
- (b) to inspect affiliated Colleges, and
- (c) to inspect such schools as may from time to time be indicated by the Syndicate.

## CHAPTER IX

### UNIVERSITY PROFESSORS

1. When the funds of the University permit, the Senate with the previous consent of Government shall found such Professorships as it may think fit, prescribe the conditions on which they shall be tenable, and provide in connection therewith lecture-rooms, libraries, museums, laboratories, workshops and other facilities for teaching and research.

2. The Senate shall likewise found and endow Professorships on particular subjects, from funds specially given or bequeathed for the endowment of such Professorship or, if it thinks fit, accept endowments of such Professorships, made by individual or corporate donors.

3. The Senate shall appoint and shall, subject to the conditions annexed to the tenure of any Professorship, have power to remove the Professors of the University. The Senate shall in the same manner appoint Assistant Professors, prescribe their duties and remuneration, and have power to dismiss them if necessary.

4. Demonstrators and other Assistants shall, from time to time, be assigned to Professors and Assistant Professors, subject to such conditions with regard to manner of appointment, tenure of office, duties and remuneration as shall be prescribed by the Senate.

5. The Senate shall from time to time make rules fixing the fees, if any, to be paid by the students attending the classes of Professors and Assistant Professors, and the money thus collected in fees shall be the property of the University.

6. Professors and Assistant Professors shall lecture or otherwise teach in such places as shall be, from time to time, determined by the Senate.

7. The Senate shall make rules for the retirement of, as well as the grant of bonuses and pensions to Professors, Assistant Professors, Demonstrators and other Assistants.

8. In appointing a Professor or Assistant Professor of the University the Senate shall specify the subject, that is to say, the branch or branches of knowledge for which he is appointed. He shall be authorised to lecture only in the subject or subjects indicated.

9. Endowed Professorships already accepted by the Senate shall, subject to the conditions of the endowment, be governed by these Regulations.

10. No University Professor shall be appointed without the sanction of Government.

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## CHAPTER X

### SPECIAL UNIVERSITY READERS

1. A certain sum, whenever practicable, shall be set apart annually from the University income or from any funds specially provided for the purpose by Government or other donors, for the purpose of providing special courses of lectures on particular subjects. These lectures shall be delivered generally during the cold weather months, and will be intended mainly for the benefit of graduates engaged in research work or of those who wish to prosecute special studies. The lecturers delivering such courses of lectures shall be called Special University Readers.

2. The appointment of a Special University Reader in any subject shall be made by the Senate on the recommendation of the Syndicate.

3. Special University Readers shall lecture in such places as may be from time to time determined by the Senate.

4. The fee for a course of lectures under Section 1 shall from time to time be fixed by the Syndicate, and the money thus collected in fees shall be the property of the University.

5. A Special University Reader appointed under Section 1 shall ordinarily receive a honorarium of Rs. 2,000 for a course of lectures, but in special cases this fee may be increased.

6. The Senate on the recommendation of the Syndicate shall from time to time allot funds to meet the remuneration of Demonstrators and Assistants as well as any general expenditure which may be incurred in connection with these lectures.

7. Courses of lectures delivered under Section 1 shall be printed and published at the expense of the University.

8. No Special University Reader shall be appointed without the sanction of Government.

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## CHAPTER XI

### UNIVERSITY TEACHERS

1. The University shall provide for Post-Graduate Teaching Study and Research in the Faculties of Arts, Science and Technology.

*Explanation.*—The term “Post-Graduate” as used in this Chapter has reference only to the examinations for the degrees of Master of Arts, Master of Science and Master of Science (Technology) (Chapters XXXIII, XXXVII and XX XVIIIA).

#### Part I

#### Post-Graduate Teaching in Calcutta

2. Post-Graduate Teaching in Calcutta shall be conducted only in the name and under the control of the University; for this purpose three Councils shall be constituted, namely, the Council of Post-Graduate Teaching in Arts, the Council of Post-Graduate Teaching in Science and the Council of Post-Graduate Teaching in Technology.

3. The staff for Post-Graduate Teaching in Calcutta will consist of (a) teachers appointed and paid by the University; (b) teachers whose services are, on the application of the University, lent from time to time by the local or Imperial Government or by a private institution and who during the time they work under the University are University officers; (c) teachers in Colleges whose attainments specially qualify them for Post-Graduate instruction and who undertake, at the request of the University and for a remuneration decided on by it, to deliver a course of lectures on selected topics; teachers in Colleges whose attainments specially qualify them for Post-Graduate work, and who shall be recognised by the University as Extra-Mural Lecturers; (d) persons engaged in other than educational work who undertake, at the request of the University and for a remuneration decided on by it, to deal with special subjects in which they are authorities.

Extra-Mural Lecturers shall be recommended annually by their Colleges for recognition by the University. Such recommendations, along with a statement, showing at the time of the first recognition, their qualifications, and outlining the proposed course of lectures for the ensuing session, shall reach the University not later than the 15th February in each year. Such proposals shall be placed before the Board of Higher Studies

and the Executive Committee concerned, the selection to be finally made by the Senate. Lecturers thus recognised by the University shall undertake to deliver in their own Colleges a minimum of twenty lectures in each session and such lectures shall be open both to the Post-Graduate students of the College concerned and to such other Post-Graduate students as desire to attend. Attendance at such lectures shall not be obligatory but shall be reckoned as alternative to not more than twenty per cent. of the total number of lectures delivered by the University Teachers appointed under Section 3 (a), (b), (c) and (d) and to this extent shall be regarded as constituting part of the regular course of study qualifying for admission to the M.A., M.Sc. or M.Sc. (Technology) Examination. The question of remuneration of such lecturer and tuition fees to be paid by students who attend such lectures shall be settled by the Executive Committee in consultation with the Colleges.

#### POST-GRADUATE TEACHING IN ARTS

4. The Council of Post-Graduate Teaching in Arts in Calcutta shall be composed as follows :—

(a) All persons appointed teachers for Post-Graduate instruction in Arts, under Section 3 ; such teachers will be members *ex-officio* :

(b) Four members annually appointed by the Senate :

(c) Two members annually appointed by the Faculty of Arts :

(d) Heads of all Colleges in Calcutta affiliated to the B.A. standard :

Provided that, for the purpose of the constitution of the first Council, under these Regulations, the persons mentioned in clause (a) shall be deemed to include all teachers, who, on the date of commencement of these Regulations, are engaged either under the University or in an affiliated College in Calcutta, in Post-Graduate work in Arts.

*Explanation.*—No person shall be deemed to be a “teacher” within the meaning of clause (a) of this section unless he performs independent teaching work in the Post-Graduate classes. If a question arises as to whether a member of the staff is a “teacher” for the purpose of this rule, the matter shall be referred to the Senate for decision.

5. The Council of Post-Graduate Teaching in Arts shall annually elect its own President.

6. As soon as possible, after the constitution of the Council, an Executive Committee thereof shall be annually formed as follows :—

- (1) President of the Council, *Chairman*.
- (2) Vice-Chancellor.

- (3) Heads of Departments within the jurisdiction of the Council.
- (4) Two representatives of the Senate elected by the Senate, of whom at least one shall be a Principal or Teacher of an affiliated College.
- (5) One representative of the Syndicate.
- (6) One representative of the relevant Faculty.
- (7) Eighteen members to be elected by the Post-Graduate Council concerned, of whom at least three shall be part-time Lecturers and at least two shall be University Professors other than Heads of Departments :

Provided in the case of whole-time Lecturers not more than one shall be from any one Department ; provided also that in the case of part-time Lecturers not more than one representative shall be from any one College.

7. The Boards of Higher Studies shall be constituted annually in each of the following subjects, as soon as possible after the constitution of the Council :—

- (i) English.
- (ii) Sanskrit.
- (iii) Pali.
- (iv) Arabic and Persian.
- (v) Hebrew and Syriac.
- (vi) Modern Indian Language.
- (vii) Comparative Philology.
- (viii) Mental and Moral Philosophy.
- (ix) History.
- (x) Ancient Indian History and Culture.
- (xi) Islamic History and Culture.
- (xii) Economics.
- (xiii) Political Science.
- (xiv) Commerce.
- (xv) Pure Mathematics.
- (xvi) Latin.
- (xvii) Education.

8. The Board of Higher Studies in each subject or group of subjects shall consist of—

(a) Teachers of that subject or group of subjects appointed under Section 3 ; such teachers shall be members *ex-officio*.

(b) Three persons selected by the Council from amongst its members.

(c) Not more than two members co-opted by the persons mentioned in clauses (a) and (b) from amongst those engaged

in Post-Graduate teaching in the subject concerned in places outside Calcutta :

Provided that in the case of the Board of Higher Studies in Islamic History and Culture, for the first three years after the institution of the course of studies in Islamic History and Culture in the University, five experts are to be appointed by the Senate on the recommendation of the Executive Committee of the Council of Post-Graduate Teaching in Arts. The temporary vacancies in the places of the experts shall be filled up by the Executive Committee.

Where a Board of Higher Studies as constituted above does not contain at least 33 per cent. of members who are also members of the relevant ordinary Board, such a number of members shall be co-opted from the ordinary Board as will bring the percentage as near as possible to 33 :

Provided that in the case of the Board of Higher Studies in Education for the first four years after the institution of the course of studies in Education\* in the University, three experts are to be appointed by the Senate on the recommendation of the Executive Committee of the Council of Post-Graduate Teaching in Arts, in addition to those coming under 8 (a) & (b). The temporary vacancies in the places of experts shall be filled up by the Executive Committee.

9. The Senate on the recommendation of the relevant Executive Committee, which shall not be subject to confirmation by the Council, shall appoint a Head of each Department as follows :

(1) Where there is only one Professor in any Department, the Executive Committee shall recommend that the Professor be appointed the Head of the Department. If there be no Professor and there be a post of Reader, then the Executive Committee shall recommend the occupant to be the Head.

(2) In the case of a Department where clause (1) is not applicable or the relevant Executive Committee forwards a definite recommendation for its supersession in a special case, the Senate shall appoint its Head after considering the recommendation of the relevant Executive Committee.

(3) The Head shall be appointed for five years but he will be eligible for re-appointment :

Provided that the appointment of an officiating Head for a period not exceeding three months may be made by the Executive Committee when necessary.

(4) Where the Executive Committee considers it desirable, it may recommend to the Senate that the term of office of the Head of a Department should terminate. It will be open to the

\* Course of Studies in Education instituted for the first time in 1949.

Senate to accept the recommendation provided a two-thirds majority of the members present at a special meeting of the Executive Committee, called for the purpose, is in favour of such recommendation.

The duties of Heads of Departments shall be—

(a) The Head of a Department shall be responsible to the University and primarily to the relevant Executive Committee, for carrying out the decisions of the University within the Department and for ensuring efficient working.

(b) He shall be the Chairman of the relevant Board of Higher Studies.

(c) He shall arrange the time-table and distribution of work in consultation with the other teachers of the Department. Any case of difference between the Head of a Department and a teacher of the Department regarding the arrangement of the time-table and distribution of work shall be decided by the Executive Committee concerned.

(d) He shall be responsible for the proper expenditure of money allocated to the Department and for ensuring that a proper account is kept of the appliances, apparatus, etc., in the Department.

“Proper” here includes “in accordance with the procedure decided by competent authority.”

(e) He shall ensure, in consultation with the other teachers, that the students receive such advice and guidance as they may require, with regard to their courses of studies and other matters. He shall also, in consultation with other members of the staff, allocate students to individual members of the staff for tuition and guidance for the purposes generally indicated hereafter in Sections 38 and 39.

(f) He will perform such other duties as have been or may be entrusted to him by the Senate.

10. The Council mentioned in Section 4 is vested with authority, subject to the ultimate control of the Senate (communicated by the Syndicate), to deal with all questions relating to the organisation and management of Post-Graduate Teaching in Arts in Calcutta.

The Executive Committee of the Council will receive and consider reports from the Boards of Higher Studies as to the progress made in their respective subjects and the results of the examinations, and will exercise such supervision and give such direction as may be necessary to ensure regularity of work and maintenance of discipline among the students.

Subject to the provisions of Section 22 hereinafter, the Executive Committee will have the power of making temporary teaching arrangements within the Budget grants whenever

necessary. But whenever the proposed arrangements involve financial commitments, the Executive Committee shall refer the matter in the first instance to the Post-Graduate Finance Committee, and shall place its recommendation before the Senate for sanction together with a report thereon from the University Finance Committee. The temporary arrangements in such cases shall be subject to the sanction of the Senate.

11. The Board of Higher Studies in each subject shall, for purposes of Post-Graduate teaching and Post-Graduate examination, make proposals regarding—

- (a) courses of study ;
- (b) text-books or recommended books ;
- (c) standards and conduct of examinations ;
- (d) teaching requirements from year to year other than preparation of time-table and distribution of work among the members of the staff ;
- (e) appointment of examiners ; and
- (f) such other matters as may, from time to time, be specified by the Council with the approval of the Senate.

Proceedings of the Boards of Higher Studies shall be subject to confirmation, revision or modification by the Executive Committee which shall also have the power to send such proceedings back to the Boards of Higher Studies for further consideration.

Proceedings of the Executive Committee, except as otherwise provided for, shall be subject to confirmation, revision or modification by the Council which shall also have the power to send such proceedings back to the Executive Committee for further consideration.

Proceedings of the Council shall be transmitted to the Senate through the Syndicate with such observations, if any, as the Syndicate may deem necessary, and shall be subject to confirmation by the Senate.

The Council shall report on any subject that may be referred to it by the Senate. Any member or any number of members of the Senate may make any recommendation and may propose any regulations for the consideration of the Council. The Senate may, if necessary, direct the Council to review its decision on any matter.

12. Each Board of Higher Studies and other competent body under the Post-Graduate Department shall, not less than six months before the termination of the academic session, formulate the requirements of its special department, during the ensuing session, together with an estimate of the probable financial cost. The Executive Committee shall thereupon

examine the said requirements and formulate the consolidated demands of all departments for scrutiny and for preparation of the Budget Estimates by the Post-Graduate Finance Committee.

### POST-GRADUATE TEACHING IN SCIENCE

13. The Council of Post-Graduate Teaching in Science in Calcutta shall be composed as follows :—

(a) All persons appointed teachers for Post-Graduate instruction in Science, under Section 3 ; such teachers shall be members *ex-officio* :

(b) Four members annually appointed by the Senate :

(c) Two members annually appointed by the Faculty of Science :

(d) Heads of all Colleges in Calcutta affiliated to the B.Sc. standard :

Provided that, for the purpose of the constitution of the first Council, under these Regulations, the persons mentioned in clause (a) shall be deemed to include all teachers, who, on the date of commencement of these Regulations, are engaged, either under the University or in an affiliated College in Calcutta, in Post-Graduate work in Science.

*Explanation.*—No person shall be deemed to be a “teacher” within the meaning of clause (a) of this section unless he performs independent teaching work in the Post-Graduate classes. If a question arises as to whether a member of the staff is a “teacher” for the purpose of this rule, the matter shall be referred to the Senate for decision.

14. The Council of Post-Graduate Teaching in Science shall annually elect its own President.

15. As soon as possible after the constitution of the Council, an Executive Committee thereof shall be annually formed as follows :—

(1) President of the Council, *Chairman*.

(2) Vice-Chancellor.

(3) Heads of Departments within the jurisdiction of the Council.

(4) Two representatives of the Senate elected by the Senate, of whom at least one shall be a Principal or Teacher of an affiliated College.

(5) One representative of the Syndicate.

(6) One representative of the relevant Faculty.

(7) Eighteen members to be elected by the Post-Graduate Council concerned, of whom at least three shall be part-time Lecturers and at least four shall be University Professors other than Heads of Departments :

Provided in the case of whole-time Lecturers not more than one shall be from any one Department ; provided also that in

the case of part-time Lecturers not more than one representative shall be from any one College.

(8) One representative of each of the three Trust Funds of the University, *viz.*, Governing Body of the Sir Taraknath Palit Trusts, Board of Management of the Sir Rashbehary Ghose Endowments and Board of Management of the Khaira Fund.

16. The Boards of Higher Studies shall be constituted annually in each of the following subjects, as soon as possible, after the constitution of the Council :—

- (i) Applied Mathematics.
- (ii) Pure Physics.
- (iii) Pure Chemistry.
- (iv) Botany.
- (v) Physiology.
- (vi) Geology.
- (vii) Zoology.
- (viii) Statistics.
- (ix) Geography.
- (x) Psychology.
- (xi) Anthropology.

*Note.*—Should arrangements be made at any time for instruction by the University in any branch of Science other than those mentioned above, a Board of Higher Studies in each such subject shall forthwith be constituted.

17. The Board of Higher Studies in each subject or group of subjects shall consist of—

(a) Teachers of that subject or group of subjects appointed under Section 3, such teachers shall be members *ex-officio*.

(b) Three persons elected by the Council from amongst its members.

(c) Not more than two members co-opted by the persons mentioned in clauses (a) and (b) from amongst those engaged in Post-Graduate Teaching in the subject concerned in places outside Calcutta.

When a Board of Higher Studies as constituted above does not contain at least 33 per cent. of members who are also members of the relevant Ordinary Board, such a number of members shall be co-opted from the Ordinary Board as will bring the percentage as near as possible to 33.

18. The Senate on the recommendation of the relevant Executive Committee, which shall not be subject to confirmation by the Council, shall appoint a Head of each Department as follows :—

(1) Where there is only one Professor in any Department, the Executive Committee shall recommend that the Professor be appointed the Head of the Department. If there be no Professor and there be a post of Reader, then the Executive Committee shall recommend the occupant to be the Head.



(2) In the case of a Department where clause (1) is not applicable or the relevant Executive Committee forwards a definite recommendation for its supersession in a special case, the Senate shall appoint its Head after considering the recommendation of the relevant Executive Committee.

(3) The Head shall be appointed for five years but he will be eligible for re-appointment :

Provided that the appointment of an officiating Head for a period not exceeding three months may be made by the Executive Committee when necessary.

(4) Where the Executive Committee considers it desirable, it may recommend to the Senate that the term of office of the Head of a Department should terminate. It will be open to the Senate to accept the recommendation provided a two-thirds majority of the members present at a special meeting of the Executive Committee, called for the purpose, is in favour of such recommendation.

The duties of Heads of Departments shall be—

(a) The Head of a Department shall be responsible to the University and primarily to the relevant Executive Committee for carrying out the decisions of the University within the Department and for ensuring efficient working.

(b) He shall be the Chairman of the relevant Board of Higher Studies.

(c) He shall arrange the time-table and distribution of work in consultation with the other teachers of the Department. Any case of difference between the Head of a Department and a teacher of the Department regarding the arrangement of the time-table and distribution of work shall be decided by the Executive Committee concerned.

(d) He shall be responsible for the proper expenditure of money allocated to the Department and for ensuring that a proper account is kept of the appliances, apparatus, etc., in the Department.

“Proper” here includes “in accordance with the procedure decided by competent authority.”

(e) He shall ensure, in consultation with the other teachers, that the students receive such advice and guidance as they may require, with regard to their courses of studies and other matters. He shall also, in consultation with other members of the staff, allocate students to individual members of the staff for tuition and guidance for the purposes generally indicated hereafter in Sections 38 and 39.

(f) He will perform such other duties as have been or may be entrusted to him by the Senate.

19. The Council mentioned in Section 13 is vested with authority, subject to the ultimate control of the Senate

(communicated by the Syndicate), to deal with all questions relating to the organisation and management of Post-Graduate Teaching in Science in Calcutta.

The Executive Committee of the Council shall receive and consider reports from the Boards of Higher Studies as to the progress made in their respective subjects and the results of the examinations and shall exercise such supervision and give such directions as may be necessary to ensure regularity of work and maintenance of discipline among the students.

Subject to the provision of Section 22 hereinafter, the Executive Committee will have the power of making temporary teaching arrangements within the Budget grants whenever necessary. But if the proposed arrangements involve additional financial commitments, the Executive Committee shall refer the matter in the first instance to the Post-Graduate Finance Committee, and shall place its recommendation before the Senate for sanction together with a report thereon from the University Finance Committee. The temporary arrangements in such cases shall be subject to the sanction of the Senate.

20. The Board of Higher Studies in each subject shall, for purposes of the Post-Graduate teaching and Post-Graduate examination, make proposals regarding—

- (a) courses of study ;
- (b) text-books or recommended books ;
- (c) standards and conduct of examinations ;
- (d) teaching requirements from year to year other than preparation of time-table and distribution of work among the members of the staff ;
- (e) appointment of examiners ; and
- (f) such other matters as may, from time to time, be specified by the Council with the approval of the Senate.

Proceedings of the Boards of Higher Studies shall be subject to confirmation, revision or modification by the Executive Committee which shall also have the power to send such proceedings back to the Boards of Higher Studies for further consideration.

Proceedings of the Executive Committee, except as otherwise provided for, shall be subject to confirmation, revision or modification by the Council which shall also have the power to send such proceedings back to the Executive Committee for further consideration.

Proceedings of the Council shall be transmitted to the Senate through the Syndicate with such observations, if any, as the Syndicate may deem necessary, and shall be subject to confirmation by the Senate.

The Council shall report on any subject that may be referred to it by the Senate. Any member or any number of members of the Senate may make any recommendation and may propose any regulations for the consideration of the Council. The Senate may, if necessary, direct the Council to review its decision on any matter.

21. Each Board of Higher Studies and other competent body under the Post-Graduate Department shall, not less than six months before the termination of the academic session, formulate the requirements of its special department, during the ensuing session, together with an estimate of the probable financial cost. The Executive Committee shall thereupon examine the said requirements and formulate the consolidated demands of all departments for scrutiny and for preparation of the Budget Estimates by the Post-Graduate Finance Committee.

#### POST-GRADUATE TEACHING IN TECHNOLOGY

13-A. The Council of Post-Graduate Teaching in Technology in Calcutta shall be composed as follows :—

(a) All persons appointed teachers for Post-Graduate instruction in Technology, under Section 3 ; such teachers shall be members *ex-officio*.

(b) Four members annually appointed by the Senate.

(c) Two members annually appointed by the Faculty of Technology.

(d) Heads of all Colleges in Calcutta affiliated to the Bachelor of Science (Technology) standard :

Provided that, for the purpose of the constitution of the first Council under these Regulations, the persons mentioned in clause (a) shall be deemed to include all teachers, who, on the date of commencement of these Regulations, are engaged, either under the University or in an affiliated College in Calcutta, in Post-Graduate work in Technology.

*Explanation*—No person shall be deemed to be a 'teacher' within the meaning of clause (a) of this section unless he performs independent teaching work in the Post-Graduate classes. If a question arises as to whether a member of the staff is a 'teacher' for the purpose of this rule, the matter shall be referred to the Senate for decision.

14-A. The Council of Post-Graduate Teaching in Technology shall annually elect its own President.

15-A. As soon as possible after the constitution of the Council, an Executive Committee thereof shall be annually formed as follows :—

(1) President of the Council, *Chairman*.

(2) Vice-Chancellor.

(3) Heads of Departments within the jurisdiction of the Council.

• (4) Two representatives of the Senate elected by the Senate, of whom at least one shall be a Principal or Teacher of an affiliated College.

(5) One representative of the Syndicate.

(6) One representative of the relevant Faculty.

(7) Six members to be elected by the Post-Graduate Council concerned of whom at least two shall be part-time Lecturers:

Provided in the case of whole-time Lecturers not more than one shall be from any one Department; provided also that in the case of part-time Lecturers not more than one representative shall be from any one College.

(8) Two representatives from the Board of Management of the Sir Rashbehary Ghose Endowments.

16-A. The Boards of Higher Studies shall be constituted annually in each of the following subjects, as soon as possible, after the constitution of the Council :—

(i) Applied Physics.

(ii) Radio-Physics and Electronics.

(iii) Applied Chemistry.

*Note.*—Should arrangements be made at any time for instructions by the University in any branch of Technology other than those mentioned above, a Board of Higher Studies in each subject shall forthwith be constituted.

17-A. The Board of Higher Studies in each subject shall consist of—

(a) Teachers of that subject appointed under Section 3, such teachers shall be members, *ex-officio*.

(b) Three persons elected by the Council from amongst the members.

(c) Three Technical experts and two nominees—one nominated by the All-India Council for Technical Education and one by the Central Government to be co-opted by members mentioned in (a) and (b).

18-A. The Senate on the recommendation of the relevant Executive Committee, which shall not be subject to confirmation by the Council, shall appoint a Head of each Department as follows :—

(i) Where there is only one Professor in any Department, the Executive Committee shall recommend that the Professor be appointed the Head of the Department. If there be no Professor and there be a post of Reader, then the Executive Committee shall recommend the occupant to be the Head.

(ii) In the case of a Department where clause (i) is not applicable or the relevant Executive Committee forwards a definite recommendation for its supersession in a special case, the Senate shall appoint its Head after considering the recommendation of the relevant Executive Committee.

(iii) The Head shall be appointed for five years but he will be eligible for re-appointment :

Provided that the appointment of an officiating Head for a period not exceeding three months may be made by the Executive Committee when necessary.

(iv) Where the Executive Committee considers it desirable, it may recommend to the Senate that the term of office of the Head of a Department should terminate. It will be open to the Senate to accept the recommendation provided a two-thirds majority of the members present at a special meeting of the Executive Committee, called for the purpose, is in favour of such recommendation.

The duties of Heads of Departments shall be—

(a) The Head of a Department shall be responsible to the University and primarily to the relevant Executive Committee for carrying out the decisions of the University within the Department and for ensuring efficient working.

(b) He shall be the Chairman of the relevant Board of Higher Studies.

(c) He shall arrange the time-table and distribution of work in consultation with the other teachers of the Department. Any case of difference between the Head of the Department and a teacher of the Department regarding the arrangement of the time-table and distribution of work shall be decided by the Executive Committee concerned.

(d) He shall be responsible for the proper expenditure of money allocated to the Department and for ensuring that a proper account is kept of the appliances, apparatus, etc., in the Department.

‘Proper’ here includes ‘in accordance with the procedure decided by competent authority.’

(e) He shall ensure, in consultation with the other teachers, that the students receive such advice and guidance as they may require with regard to their courses of studies and other matters. He shall also, in consultation with other members of the staff, allocate students to individual members of the staff for tuition and guidance for the purposes generally indicated hereafter in Sections 38 and 39.

(f) He will perform such other duties as have been or may be entrusted to him by the Senate.

19-A. The Council mentioned in Section 13-A is vested with authority, subject to the ultimate control of the Senate (communicated by the Syndicate), to deal with all questions relating to the organisation and management of Post-Graduate Teaching in Technology in Calcutta.

The Executive Committee of the Council shall receive and consider reports from the Boards of Higher Studies as to the progress made in their respective subjects and the results of the examinations and shall exercise such supervision and give such directions as may be necessary to ensure regularity of work and maintenance of discipline among the students.

Subject to the provision of Section 22 hereinafter, the Executive Committee will have the power of making temporary teaching arrangements within the Budget grants whenever necessary. But if the proposed arrangements involve additional financial commitments, the Executive Committee shall refer the matter in the first instance to the Post-Graduate Finance Committee, and shall place its recommendation before Senate for sanction together with a report thereon from the University Finance Committee. The temporary arrangements in such cases shall be subject to the sanction of the Senate.

20-A. The Board of Higher Studies in each subject shall, for purposes of the Post-Graduate Teaching and Post-Graduate examination, make proposals regarding—

- (a) courses of study ;
- (b) text-books or recommended books ;
- (c) standards and conduct of examinations ;
- (d) teaching requirements from year to year other than preparation of time-table and distribution of work among the members of the staff ;
- (e) appointments of examiners ; and
- (f) such other matters as may, from time to time, be specified by the Council with the approval of the Senate.

Proceedings of the Boards of Higher Studies shall be subject to confirmation, revision or modification by the Executive Committee which shall also have the power to send such proceedings back to the Boards of Higher Studies for further consideration.

Proceedings of the Executive Committee, except as otherwise provided for, shall be subject to confirmation, revision or modification by the Council which shall also have the power to send such proceedings back to the Executive Committee for further consideration.

Proceedings of the Council shall be transmitted to the Senate through the Syndicate with such observations, if any, as the Syndicate may deem necessary, and shall be subject to confirmation by the Senate.

The Council shall report on any subject that may be referred to it by the Senate. Any member or any number of members of the Senate may make any recommendation and may propose any regulations for the consideration of the Council. The Senate may, if necessary, direct the Council to review its decision on any matter.

21-A. Each Board of Higher Studies and other competent body under the Post-Graduate Department shall, not less than six months before the termination of the academic session, formulate the requirements of its special department, during the ensuing session, together with an estimate of the probable financial cost. The Executive Committee shall thereupon examine the said requirements and formulate the consolidated demands of all Departments for scrutiny and for preparation of the Budget Estimates by the Post-Graduate Finance Committee.

#### APPOINTMENTS

22. (I) Whenever there is a vacancy in a Professorship or Readership other than an Endowed Chair to which special conditions as to the method of appointment it may apply in accordance with the provisions of the Trust Deed concerned, a Selection Committee shall be set up constituted as follows :—

- (i) Vice-Chancellor, *Chairman*.
- (ii) *President* of the relevant Post-Graduate Council.
- (iii) One member appointed by the Senate.
- (iv) One expert appointed by the Syndicate.
- (v) One member appointed by the relevant Executive Committee. Such appointment shall not be subject to confirmation by the Council.
- (vi) & (vii) Two experts (not connected with this University) to be nominated by other Universities, bodies or persons on the invitation of the Syndicate after consultation with the relevant Executive Committee.

(viii) One expert nominated by the Chancellor after consultation with the Vice-Chancellor.

(II) Whenever there is a vacancy in a post other than that of a Professor or Reader, a Selection Committee shall be set up constituted as follows :—

- (i) Vice-Chancellor, *Chairman*.
- (ii) *President* of the relevant Post-Graduate Council.
- (iii) *Dean* of the Faculty concerned.
- (iv) Head of the relevant Department.
- (v) & (vi) Two members to be nominated by the Syndicate, of whom one shall be a Principal or a Teacher of an affiliated College.

(vii) & (viii) Two members appointed by the relevant Post-Graduate Executive Committee, of whom at least one, where possible, shall be a Professor or a Reader of the Department. Such appointment shall not be subject to confirmation by the Council.

(ix) If the Committee thus constituted does not contain any Mahomedan member, the Syndicate may nominate an additional member who shall be a Mahomedan.

Appointments under Section 22 (I) and (II) shall be made by the Senate only in accordance with the recommendations of the Committee which shall include particular proposals relating to tenure, pay and other conditions of service. The Senate shall have the power only to refer back the recommendations to the Committee for reconsideration.

The procedure laid down in this section shall not apply in the case of a temporary vacancy which is not likely to exceed one year.

23. (1) The Senate may, on the recommendation of the appropriate Selection Committee constituted for the appointment of Professors and Lecturers.

Honorary Professors, Readers and Lecturers. Readers, confer on part-time teachers the status of Professors or Readers without any extra remuneration. In these cases such proposals should be initiated in the first instance by the relevant Executive Committee. The Selection Committee shall follow the same standard in the matter of these Honorary appointments as in the case of Professors or Readers.

Provided that the number of these Honorary appointments shall not exceed three in the case of Professors and six in the case of Readers.

(2) It shall also be open to the Senate to appoint Honorary Lecturers whenever necessary.

24. If, in any particular year, owing to increase in the number of students, the increase in teaching work (particularly tutorial) is such that the normal staff cannot reasonably be expected to cope with it, temporary appointments of Lecturers outside the grade, or of part-time Lecturers, may be made by the Senate. In making such appointments the claims of applicants who have already served the University will be given priority. For such appointments the Executive Committee shall make definite proposals to the Senate for sanction.

25. (1) All whole-time teachers shall be given contracts embodying their terms of engagement.

The contract shall define the term "whole-time teacher."

(2) The following procedure shall be followed with regard to all appointments:

(a) In the case of new appointments whole-time teachers shall ordinarily be engaged on probation for 2 years after which their appointments may be made permanent. In the case of appointment of Professors, this rule may be relaxed.

(b) When any vacancy arises, the post shall be advertised and applications invited. A Selection Committee, in accordance



with Section 22, shall be set up and shall consider the applications received, together with any statement or recommendation which may be sent by the relevant Executive Committee. The choice of the Selection Committee shall not necessarily be confined to those who have applied.

(c) No appointment shall be made unless the Selection Committee is satisfied that the candidate possesses the full minimum qualifications considered necessary for the post.

(3) The above rules shall not apply in the case of the present incumbents who will be re-appointed on the recommendation of the Special Selection Committees under Section 27.

(4) The whole-time teachers including Professors will be granted such leave as may be admissible to them under rules framed by the Senate from time to time.

The relevant Executive Committee will have the power to grant leave to part-time teachers as may be considered necessary provided that the leave so granted shall not be more liberal than that admissible to whole-time teachers.

(5) All whole-time teachers in grade shall retire at the age of 60 subject to the proviso that by a special resolution of the Senate, their term of appointment may be extended up to 65 on the recommendation of the relevant Executive Committee and the Syndicate.

25A. The procedure laid down in Sections 22 and 25 (2) (b) relating to the appointment of teachers shall not, unless otherwise decided by the Senate, apply in the case of an extension of a teacher's appointment beyond the age of 60 or of the making permanent of an appointment which was temporary or for a short period or probationary in the first place but which was advertised as a possible permanent vacancy. Such renewals or extensions shall be made by the Senate on the recommendation of the relevant Executive Committee and the Syndicate.

#### POST-GRADUATE FINANCE COMMITTEE

25B. A Post-Graduate Finance Committee shall be appointed annually for the Post-Graduate Departments in Arts and Science, other Teaching Departments, if any, and also the Trust Funds in so far as and to the extent such Funds obtain the contributions from the General Fund.

The Post-Graduate Finance Committee shall consist of—

- (1) The Vice-Chancellor.
- (2) The President, Council of Post-Graduate Teaching in Arts.
- (3) The President, Council of Post-Graduate Teaching in Science.

(4) & (5) Two members to be nominated by the Executive Committee of the Council of Post-Graduate Teaching in Arts.

(6) & (7) Two members to be nominated by the Executive Committee of the Council of Post-Graduate Teaching in Science.

(8) One member to be nominated by the Syndicate.

(9) One member to be nominated by the Senate.

If the same person holds more than one office under (1), (2) and (3) above, the Senate shall give necessary directions for appointment of a substitute member or members.

The Committee shall elect its own President each year. The Secretaries of the Post-Graduate departments in Arts and Science will be the joint Secretaries of the Committee, *ex-officio*. Five members shall constitute a quorum.

It shall be the duty of the Committee to prepare the Budget Estimates of the Teaching Departments of the University after scrutinising the demands made by the Executive Committees or other relevant bodies. The Budget Estimates shall then be placed before the University Finance Committee for preparation of the consolidated Budget of the University in its final form.

All proposals involving new expenditure during the year (not covered by Budget grants) shall be placed before the Committee for scrutiny. Such scrutiny shall involve consideration of the merits of different schemes as well as their financial implications. The recommendations of the Committee shall be placed before the University Finance Committee for submission to the Senate or other relevant authorities for sanction. No action shall be taken by the body concerned in respect of such proposals (except in cases of emergency) until after such sanction has been obtained.

The Post-Graduate Finance Committee shall maintain a watch over the progress of income and expenditure as provided for in the Budget.

The Committee shall frame from time to time rules which shall be considered by the Executive Committees of the Councils of Post-Graduate Teaching in Arts and Science at a joint sitting and, together with such observations as they may make thereon, shall be laid before the Senate for sanction.

#### SECRETARIES

26. There shall be a salaried and whole-time Secretary to the Council of Post-Graduate Teaching in Arts and its Executive Committee and also a salaried and whole-time Secretary to the Council of Post-Graduate Teaching in Science and its Executive Committee. The Secretary shall discharge such duties as the Executive Committee concerned may decide, provided that if the duties proposed to be assigned by the Executive Committee concerned are in conflict with any of the existing regulations as

contained in Chapter XI, the Senate will decide whether such modification should be made or not. He shall be appointed by the relevant Executive Committee subject to confirmation by the Senate.

Each Secretary shall be assisted by a permanent staff of subordinate assistants and servants.

### TRANSITORY REGULATIONS

27. (1) For each teaching department in the University a Special Selection Committee shall be constituted as set forth hereafter. It shall select whole-time members of the present staff for appointment on a permanent basis in accordance with the scheme laid down for the purpose by the Senate.

(2) This Special Selection Committee shall consider the work and qualifications of all existing members of the staff and a report thereon from the relevant Executive Committee and, where such work has been satisfactory, shall recommend to the Senate that the whole-time teachers be given permanent appointments, provided that the number of such appointments shall not exceed the requirements of the scheme referred to above. Where the number of teachers who have given satisfactory service is greater than the number of posts to be filled the Special Selection Committee shall make definite recommendation as to which teachers shall constitute the permanent cadre.

(3) On the recommendation of the Special Selection Committee, the Senate will also appoint part-time Lecturers for such period as it may decide.

(4) Each of the Special Selection Committees stated above shall consist of 8 members and shall be constituted as follows :—

- (i) The Vice-Chancellor, *Chairman*.
- (ii) The President of the Post-Graduate Council concerned.
- (iii) & (iv) Two members appointed by the Executive Committee of the relevant Post-Graduate Council, of whom (a) one shall be an expert (if possible a Professor of the Board concerned but not a whole-time or a part-time Lecturer in the subject in which the appointment is being made) and (b) one other member not connected with the Board concerned. Such appointment shall not be subject to confirmation by the Council.
- (v) & (vi) Two members nominated by the Syndicate, of whom at least one shall be an expert who shall not be a member of the teaching staff of the University. Whenever possible this expert shall be selected from the staff of another University.

(vii) Dean of the Faculty concerned.

(viii) An expert in the subject to be nominated by the Chancellor after consultation with the Vice-Chancellor.

## Part II

### Post-Graduate Teaching Outside Calcutta

28. The Heads of Colleges outside Calcutta, not affiliated up to the M.A. or M.Sc. standard in a subject, may, from time to time, submit to the Registrar the names of Professors in their respective Colleges who are prepared to deliver lectures on, and conduct classes for, research or advanced work for Post-Graduate courses of study in such subject.

29. The Syndicate shall place each name so recommended before the Board of Higher Studies concerned, and shall, after consideration of the report of the Board, recommend to the Senate Lecturers for Post-Graduate courses of study. In recommending Lecturers, for any course, the Syndicate shall have regard to (a) the qualifications of the applicant, (b) the desirability of avoiding an unnecessary multiplication of lectures on the same subject in the same centre, and (c) in the case of Science subjects, the equipment for advanced practical work which can be provided.

30. The Senate shall have power, upon the recommendation of the Syndicate as aforesaid, to appoint such persons Lecturers for Post-Graduate instruction. Such Lecturers shall in the first instance be appointed for two years, but they shall be eligible for re-appointment for such term as the Senate may determine in each instance.

31. Every Lecturer thus appointed or re-appointed must deliver at least 30 lectures in the course of the academical year.

32. If a lectureship becomes vacant before the expiry of the term of appointment, the Senate may, on the application of the College in which the lectureship is held, appoint a temporary Lecturer for the remainder of the original term. The procedure prescribed in Section 29 shall be followed in such cases.

33. Nothing in this chapter shall be deemed to debar in any way the affiliation of Colleges outside Calcutta to the standard of M.A. or M.Sc. Examination in any subject under the provisions of Chapter XVIII of the Regulations.

## Part III

### General

34. All persons other than University Professors, appointed under Sections 3, 30 and 32, shall be styled "University Readers or University Lecturers" as the case may be.

35. The Board of Examiners in each subject for the M.A. and M.Sc. Examinations shall consist of—

- (a) Internal Examiners, and
- (b) External Examiners.

The Internal Examiners in any subject shall be such of the members of the Board of Higher Studies in that subject as have been appointed teachers under Section 3. The External Examiners shall be appointed by the Executive Committee on the recommendation of the Board of Higher Studies concerned.

*Explanation.*—It is not intended that every member of the Board of Examiners thus constituted shall actually frame questions or examine answer-papers; this work shall be shared by the members of the Board in such manner as they may determine. But the results of the examinations in any subject shall be submitted to, and reported upon, by the entire Board of Examiners in that subject.

36. No person whose salary is, or is to be, paid from funds supplied by Government, shall be appointed or re-appointed University Reader or University Lecturer, without the previous sanction of Government. The names of all other persons appointed or re-appointed University Readers or University Lecturers shall be notified to the Local Government within one week from the date of the decision of the Senate. If, within six weeks from the receipt of such notification, Government intimate to the University that a specified appointment is objectionable on other than academic grounds, such decision shall take effect and the appointment shall stand cancelled.

37. The Senate, on the recommendations of the Councils, shall, from time to time, frame rules, consistent with the Regulations, to facilitate the management of Post-Graduate Studies in Calcutta.

In particular, and without prejudice to the generality of the foregoing powers, such rules may

- (a) define the duties of the President of a Council;
- (b) provide for the appointment of a Vice-President of a Council, and define his duties;
- (c) provide for the appointment of a teacher as Principal;
- (d) provide that teachers appointed under clauses (a) and (b) of Section 3 be attached to an affiliated College in Calcutta or participate in the work of instruction of Under-Graduate students of affiliated Colleges, with the concurrence of the University, the Colleges and the Teachers concerned;
- (e) provide for the assignment of students to tutors and define their relation;
- (f) regulate the conditions of residence of Post-Graduate students;
- (g) provide that a Post-Graduate student may, with the permission of the Principal of the College from which he

graduated, continue to be a member of such College and that his name may be borne on its rolls ;

(h) provide for the due recognition of the association of a student with an affiliated College under the preceding clause or otherwise;

(i) provide for joint meetings of the Councils, Executive Committees and Boards of Higher Studies.

38. Notwithstanding the Regulations hereinbefore contained the name of a student of the Post-Graduate Classes in Calcutta may, with the permission of the Principal of the College from which he graduated, continue to be borne on the rolls of such College, and he may reside in the College hostel or attached mess, enjoy the benefit of the College library, laboratory and other like institutions, and receive assistance in his studies from the College staff. Such student, in so far as he is a member of the College, shall be subject, in matters of discipline, to the authority of the Principal.

A student of the Post-Graduate Classes in Calcutta who is unable to attach himself to the College from which he graduated, may, with the sanction of the Executive Committee concerned, attach himself to another College, and, thereupon, the provisions of the preceding paragraph shall apply to such student.

Students of the Post-Graduate Classes in Calcutta who are unable to attach themselves to a College under either of the preceding paragraphs and who do not reside with their parents, guardians or families, shall be subject to such rules for their residence and control as may from time to time be prescribed by the Senate on the recommendations of the Councils.

39. Every student of the Post-Graduate Classes in Calcutta shall be assigned by the Board of Higher Studies in his subject to a particular member of the staff as tutor. It shall be the duty of such tutors (in accordance with rules to be framed from time to time by the Senate on the recommendations of the Councils) to see their pupils singly or in groups at stated times to advise them with regard to the lectures they should attend and to their courses of reading and practical work, and to assist them in any difficulties that they may encounter in their studies.

40. Nothing in these Regulations shall be deemed to authorise interference in any shape with the rights and obligations of the Governing Body of the Sir Taraknath Palit Trusts and the Board of Management of the Sir Rashbehary Ghose Endowments or with their control of the Sir Taraknath Palit Laboratory or with the work of the Professors and other officers and scholarship-holders appointed under those endowments.

## RULES OF PROCEDURE

41. Each Council shall meet ordinarily four times a year and on other occasions when convened by the President.

Each Board of Higher Studies shall meet ordinarily four times a year and on other occasions when convened by the Chairman.

A special meeting of a Council shall be convened on the requisition of six members; a special meeting of an Executive Committee or of a Board of Higher Studies shall be convened on the requisition of three members.

42. At meetings of a Council and its Executive Committee the President shall preside and at a meeting of a Board of Higher Studies the Chairman shall preside. In the absence of the President or Chairman, as the case may be, or when the office of President or Chairman is vacant, the members present shall elect a Chairman for the occasion.

43. Five clear days' notice shall be given for meetings of the Councils and of the Boards of Higher Studies; three clear days' notice shall be given for meetings of the Executive Committees.

44. Fifteen members of a Council shall constitute a quorum and the quorum of an Executive Committee or a Board of Higher Studies shall be the number representing one-third of the members in each case.

45. The rules for debate contained in Chapter I of the Regulations shall apply to meetings of the Councils as far as practicable, but the Chairman of the meeting may relax their operation at his discretion.

46. The election of members of the Executive Committees [as contemplated by clause (7) of Sections 6 and 15] shall take place at special meetings, of which fifteen clear days' notice shall be given by the Secretary. Each member of the Council will, on receipt of the notice, be entitled to propose the name of one person for election to the Executive Committee. Such proposals must reach the Secretary seven clear days before the meeting. The Secretary shall cause lists of the nominees to be printed and forwarded to the members concerned four clear days before the meeting. In any contested election, the voting shall be by ballot and the procedure shall be the same as that laid down in Sections 63-65 of Chapter I of the Regulations.

47. The procedure prescribed in the preceding section shall, *mutatis mutandis*, be followed in the election and co-option of members of Boards of Higher Studies [as contemplated by clauses (b) and (c) of Sections 8 and 17].

48. If by reason of death, resignation, or like cause, a vacancy occurs in any of the Councils, Executive Committees, or Boards of Higher Studies, between the dates of two annual elections, the Body concerned shall forthwith fill up the vacancy and in such event the same procedure shall be followed as in the case of an annual election.

49. From the date of commencement of the Regulations contained in this chapter, a fund shall be constituted for the promotion of Post-Graduate studies, to be called "The Post-Graduate Teaching Fund." To such fund there shall be annually credited

(a) grants from Government and benefactions made specifically for this purpose by donors;

(b) fees paid by students in the Post-Graduate Classes;

(c) one-third of the fees realised from candidates for the Matriculation, I.A., I.Sc., B.A. and B.Sc. Examinations; and

(d) such other sums as the Senate may from time to time direct

50. The powers conferred on the Councils, Executive Committees and Boards of Higher Studies by the provisions of this chapter shall be exercised by those bodies, respectively, in the manner and subject to the restrictions prescribed herein, and such power shall not be exercised by any other bodies in the University.



## CHAPTER XI-A

### POST-GRADUATE TEACHING IN MEDICAL SCIENCE

1. The University shall provide for Post-Graduate Teaching, Study and Research in the Faculty of Medicine.

Explanation :—The term 'Post-Graduate' as used in this Chapter has reference only to the examinations for the degrees of Doctor of Medicine, Master of Surgery and Master of Obstetrics, and the following Diplomas and such other degrees and Diplomas in various branches of Medical Science as may be determined by the Senate from time to time by regulations framed in this behalf on the recommendation of the relevant Bodies within the University :—

Diploma in Public Health (D.P.H.) ; Diploma in Ophthalmic Medicine and Surgery (D.O.M.S.) ; Diploma in Maternity and Child Welfare (D.M.C.W.) ; Diploma in Tuberculous Diseases (D.T.D.) ; Diploma in Obstetrics and Gynaecology (D.O.G.).

2. Post-Graduate Teaching in Medical Science in Calcutta shall be conducted only in the name and under the control of the University as hereinafter provided. For this purpose a Council named Council of Post-Graduate Teaching in Medical Science shall be constituted.

3. The staff for the Post-Graduate Teaching in Calcutta will consist of (a) Teachers appointed and paid by the University, (b) Teachers whose services are, on the application of the University, lent from time to time by the Provincial or Central Government or by an institution and who during the time they work under the University are University teachers ; (c) Teachers in Colleges whose attainments specially qualify them for Post-Graduate instruction and who undertake, at the request of the University and for a remuneration decided on by it, to deliver a course of lectures on selected topics ; teachers in Colleges whose attainments specially qualify them for Post-Graduate work, and who shall be recognised by the University as Extra-Mural Lecturers ; (d) persons engaged in other than educational work who undertake, at the request of the University and for a remuneration decided on by it, to deal with special subjects in which they are authorities.

Extra-Mural Lecturers shall be recommended annually by the colleges for recognition by the University. Such recommendations, along with a statement, showing at the

time of the first recognition, their qualifications and outlining the proposed course of instruction for the ensuing session, shall reach the University not later than February 15th in each year. Such proposals shall be placed before the Board of Higher Studies and the Executive Committee, the selection to be finally made by the Senate on the recommendation of the said Executive Committee. The Senate shall have the power to order further consideration of such recommendation. Lecturers thus recognised by the University shall undertake to impart such instruction on such subjects as may be decided upon by the Executive Committee in each year and such instruction shall be open to Post-Graduate students of the specified group concerned and to such other Post-Graduate students as desire to attend. The question of remuneration of such lecturer and tuition fee to be paid by students who attend such instruction shall be settled by the Senate on the recommendation of the Executive Committee in consultation with the Colleges.

4. A Council of Post-Graduate Teaching in Medical Science in Calcutta shall be constituted annually and be composed as follows :—

(a) *Ex-officio members*—

- (i) The Vice-Chancellor
- (ii) The Dean of the Faculty of Medicine.
- (iii) The Director of Health Services to the Government of West Bengal.
- (iv) Heads of all constituent colleges in Calcutta which are affiliated to or recognised by the University to the M.B. standard or which present candidates for any of the examinations mentioned above.

*N.B.*—A constituent College means (i) a college affiliated to the University up to the M.B. standard, (ii) a college which presents candidates for the M.B. Examinations of the Calcutta University and (iii) institutions which present candidates for any of the examinations mentioned in Section 1 above in the Calcutta University.

- (v) All persons appointed teachers for Post-Graduate instruction in Medical Science, under Section 3 above.
- (b) Four members of the Senate annually appointed by the Senate.
- (c) Four members of the Faculty of Medicine annually appointed by the Faculty of Medicine.
- (d) Two members of the Faculty of Science annually appointed by the Faculty of Science :

Provided that, for the purpose of the constitution of the first Council, under these regulations, the persons mentioned

in clause (a) (v) above shall be deemed to include all teachers who, on the date of commencement of these regulations, are in the opinion of the Syndicate engaged in Post-Graduate work in Medical Science in Calcutta or who may be appointed as Post-Graduate Teachers or on whom the status of Post-Graduate Teacher is conferred, by the following Special Committee :—

- (i) The Premier of the Province of West Bengal
- (ii) The Minister for Public Health, West Bengal
- (iii) The Vice-Chancellor
- (iv) The Dean of the Faculty of Medicine
- (v) The Director of Health Services to the Government of West Bengal
- (vi) Heads of constituent colleges or institutions mentioned in (a) (iv) above
- (vii) Three persons appointed by the Syndicate (who may not be members of the Senate).

The said Committee may consult such authorities or such persons as they deem necessary.

Explanation :—No person after the constitution of the first Council shall be deemed to be a 'teacher' within the meaning of clause (a) (v) of this section unless he performs independent teaching work in the Post-Graduate classes. If a question arises as to whether a member of staff is a 'teacher' for the purpose of this rule, the matter shall be referred to the Senate for decision.

5. The Council of Post-Graduate Teaching in Medical Science shall annually elect its own President.

6. As soon as possible after the constitution of the Council an Executive Committee thereof shall be annually formed as follows :—

- (i) The President of the Council, *Chairman*
- (ii) The Vice-Chancellor
- (iii) The Dean of the Faculty of Medicine
- (iv) The Dean of the Faculty of Science
- (v) Heads of Departments within the jurisdiction of the Council
- (vi) Two representatives of the Senate elected by the Senate, of whom at least one shall be a Principal or teacher of a constituent college or an institution mentioned above.
- (vii) One representative of the Syndicate.
- (viii) One representative of the Faculty of Medicine.
- (ix) Fifteen members to be elected by the Council, of whom at least seven shall be either Heads of or Lecturers in constituent colleges or recognised institutions concerned or University Professors or

Readers or Lecturers in the Department of Post-Graduate Teaching in Medical Science:

Provided that in the case of whole-time Lecturers not more than one shall be from any one Department; provided also that in the case of part-time Lecturers not more than one representative shall be from any one College.

7. The Boards of Higher Studies shall be constituted annually in each of the following subjects within two months of the constitution of the Council :—

- (i) Medicine.
- (ii) Surgery.
- (iii) Midwifery.
- (iv) Pathology, Bacteriology and Medical Zoology.
- (v) Anatomy.
- (vi) Physiology.
- (vii) Pharmacology.
- (viii) Bio-chemistry.
- (ix) Bio-physics.
- (x) Radiology and Radio-Therapeutics.
- (xi) Hygiene.
- (xii) Ophthalmology.

*Note.*—Should arrangements be made at any time for instruction by the University in any branch of Medical Science other than those mentioned above, a Board of Higher Studies in such subject shall be constituted as early as possible:

Provided that during the interim period between the commencement of the operation of these regulations and the constitution of the Boards the powers of the said Boards shall be exercised by the Executive Committee.

8. The Board of Higher Studies in each subject or group of subjects shall consist of—

(a) Teachers of that subjects or group of subjects appointed under Section 3, such teachers shall be members *ex-officio*.

(b) Three persons elected by the Council from amongst its members.

(c) Not more than two members may be nominated by the Syndicate from amongst the members of the Faculty of Medicine and the Faculty of Science.

Where a Board of Higher Studies as constituted above does not contain at least 33 per cent of members who are also members of the ordinary Board of Studies in Medicine, such a number of members shall be co-opted from the said ordinary Board as will bring the percentage as near as possible to 33.

9. The Senate on the recommendation of the Executive Committee of the Council, concurred in by the Syndicate, which shall not be subject to confirmation by the Council, shall appoint a Head of each Department as follows :—

(i) Where there is only one Professor in any Department the Executive Committee, shall recommend that the Professor be appointed the Head of the Department. If there be no Professor and there be a post of Reader, then the Executive Committee shall recommend the occupant to be the Head.

(ii) In the case of a Department where clause (i) is not applicable or the Executive Committee forwards a definite recommendation for its supersession in a special case, the Senate shall appoint its Head after considering the recommendation of the Executive Committee and the Syndicate as above.

(iii) The Head shall be appointed for five years but he will be eligible for re-appointment :

Provided that the appointment of an officiating Head for a period not exceeding three months may be made by the Executive Committee when necessary.

(iv) Where the Executive Committee considers it desirable it may recommend to the Senate that the term of office of the Head of a Department should terminate. It will be open to the Senate to accept the recommendation provided a two-thirds majority of the members present at a special meeting of the Executive Committee, called for the purpose, is in favour of such recommendation.

The duties of Heads of Departments shall be—

(a) The Head of a Department shall be responsible to the University and primarily to the Executive Committee for carrying out the decisions of the University within the Department and for ensuring efficient working.

(b) He shall be the Chairman of the relevant Board of Higher Studies.

(c) He shall arrange the time-table and distribution of work in consultation with the other teachers of the Department. Any case of difference between the Head of a Department and a teacher of the Department regarding the arrangement of the time-table and distribution of the work shall be decided by the Executive Committee.

(d) He shall be responsible for the expenditure of money allocated to the Department and for ensuring that an account is kept of the appliances, apparatus, etc., in the Department in accordance with the procedure decided by a competent authority.

(e) He shall ensure, in consultation with the other teachers that the students receive such advice and guidance

as they may require, with regard to their courses of studies and other matters. He shall also, in consultation with other members of the staff, allocate students to individual members of the staff for tuition and guidance for the purposes generally indicated hereinafter in Section 24.

(f) He will perform such other duties as may be entrusted to him by the Senate on the recommendation of the Executive Committee.

10. The Council mentioned in Section 4 is vested with authority, subject to the ultimate control of the Senate to deal with all questions relating to the organisation and management of Post-Graduate Teaching in Medical Science in Calcutta.

The Executive Committee of the Council shall receive and consider reports from the Boards of Higher Studies as to the progress made in their respective subjects and the results of the examinations and shall exercise such supervision and give such directions as may be necessary to ensure regularity of the work and maintenance of discipline among the students.

Subject to the provision of Section 13 hereinafter the Executive Committee will have the power of making temporary teaching arrangements within the Budget grants whenever necessary. But if the proposed arrangements involve additional financial commitments not provided in the Budget, the Executive Committee shall refer the matter in the first instance to the Finance Committee for Post-Graduate Studies in Medical Science, and shall place its recommendation before the Senate through the Syndicate for sanction together with a report thereon from the University Finance Committee. The temporary arrangements in such cases shall be subject to the sanction of the Senate.

11. The Board of Higher Studies in each subject shall, for purposes of post-graduate teaching and post-graduate examination, make proposals regarding—

- (a) courses of study
- (b) recommended books
- (c) standards and conduct of examinations
- (d) teaching requirements from year to year other than preparation of time-table and distribution of work among the members of the staff
- (e) appointment of examiners; and
- (f) such other matters as may, from time to time, be specified by the Council with the approval of the Senate.

Proceedings of the Board of Higher Studies, except as otherwise provided for, shall be subject to confirmation, revision or modification by the Executive Committee which shall also

have the power to send such proceedings back to the Boards of Higher Studies for further consideration.

Proceedings of the Executive Committee, except as otherwise provided for, shall be subject to confirmation, revision or modification by the Council which shall also have power to send such proceedings back to the Executive Committee for further consideration.

Proceedings of the Council shall be transmitted to the Senate through the Syndicate with such observations, if any, as the Syndicate may deem necessary and shall be subject to confirmation by the Senate.

The Council shall report on any subject that may be referred to it by the Senate. Any member or any number of members of the Senate may make any recommendation and may propose any regulations for the consideration of the Council. The Senate may, if necessary, direct the Council to review decision on any matter.

12. Each Board of Higher Studies and other competent body under the Post-Graduate Department shall, not less than six months before the termination of the academic session, formulate the requirements of its special department, during the ensuing session, together with an estimate of the probable financial cost. The Executive Committee shall thereupon examine the said requirements and formulate the consolidated demands of all departments for scrutiny and for preparation of the Budget Estimates by the Post-Graduate Finance Committee in Medical Science.

#### APPOINTMENTS

13. (I) Whenever there is a vacancy in a Professorship or Readership other than any Endowed Chair (which may be established) to which special conditions as to the method of appointment may apply in accordance with the provisions of the Trust Deed concerned, a Selection Committee shall be set up constituted as follows :—

- Appointment to Professorships and Readerships
- (i) The Vice-Chancellor, *Chairman*
  - (ii) The President of the Post-Graduate Council in Medical Science
  - (iii) One Member appointed by the Senate
  - (iv) One expert appointed by the Syndicate
  - (v) One member appointed by the Executive Committee

Such appointment shall not be subject to confirmation by the Council.

(vi & vii) Two experts (not connected with this University) to be nominated by other Universities, bodies or persons on the invitation of the Syndicate after consultation with the Executive Committee.

(viii) One expert nominated by the Vice-Chancellor.

(II) Whenever there is a vacancy in a post other than that of a Professor or Reader, a Selection Committee shall be set up constituted as follows :—

(i) The Vice-Chancellor, *Chairman*

(ii) The President of the Post-Graduate Council in Medical Science

(iii) The Dean of the Faculty of Medicine

(iv) Head of the relevant Department

(v & vi) Two members to be nominated by the Syndicate, of whom one shall be a Principal or a Teacher of a constituent college or an institution recognised by the University.

(vii & viii) Two members appointed by the Executive Committee, of whom at least one, where possible, shall be a Professor or Reader of the Department. Such appointments shall not be subject to confirmation by the Council.

Provided always that in the case of constituent colleges or institutions recognised by the University as above, the Committee constituted either under 13 (I) or 13 (II) shall make the appointment in consultation with the relevant authority concerned.

*Note*—The relevant authority in the case of Government Colleges will be authority or authorities indicated by the Government and in the case of other colleges under private management the relevant Governing Body concerned or any other body indicated by that Governing Body.

Appointments under Section 13 (I) and (II) shall be made by the Senate only in accordance with the recommendations of the Selection Committee which shall include particular proposals relating to tenure, pay and other conditions of service. The Senate shall have the power only to refer back the recommendations to the Committee for consideration.

The procedure laid down in this Section shall not apply in the case of a temporary vacancy not exceeding one year.

14. (1) The Senate may, on the recommendation of the appropriate Selection Committee constituted for the appointment of Professors and Readers, confer on

Honorary Lecturers, part-time teachers the status of Professors  
Readers and Professors or Readers without any extra-remuneration. In these cases such proposals should be initiated in the first instance by the Executive



Committee. The Selection Committee shall follow the same standard in the matter of these Honorary appointments as in the case of Professors or Readers.

Provided that the number of the Honorary appointments shall not exceed six in the case of Professors and nine in the case of Readers.

(2) It shall also be open to the Senate to appoint Honorary Lecturers whenever necessary.

15. If, in any particular year, owing to increase in the number of students, the increase in teaching work (particularly tutorial) is such that the normal staff cannot reasonably be expected to cope with it, temporary appointments of lecturers outside the grade, or part-time lecturers, may be made by the Senate. In making such appointments the claims of applicants who have already served the University or the constituent colleges or the recognised institutions will be given priority. For such appointments the Executive Committee shall make definite proposals to the Senate for sanction.

16. (1) All whole-time teachers shall be given contracts embodying their terms of engagement.

The contract shall define the term 'whole-time teacher'.

(2) The following procedure shall be followed with regard to all appointments :—

(a) In the case of new appointments whole-time teachers shall ordinarily be engaged on probation for 2 years after which their appointments may be made permanent. In the case of appointment of Professors and Readers this rule may be relaxed.

(b) When any permanent vacancy arises, the post shall be advertised and applications invited. A Selection Committee, in accordance with Section 13, shall be set up and shall consider the applications received, together with any statement or recommendation which may be sent by the Executive Committee. The choice of the Selection Committee, shall not necessarily be confined to those who have applied, provided that the Vice-Chancellor may with the concurrence of the Selection Committee concerned invite an eminent person to occupy the vacant post under terms and conditions determined by the Selection Committee.

(c) No appointment shall be made unless the Selection Committee is satisfied that the candidate possesses the full minimum qualifications considered necessary for the post.

(3) The whole-time teachers including Professors will be granted such leave as may be admissible to them under rules framed by the Senate from time to time.

The Executive Committee shall have the power to grant leave to part-time teachers as may be considered necessary provided that the leave so granted shall not be more liberal than that admissible to whole-time teachers.

(4) All whole-time teachers in grade shall ordinarily retire at the age of 60 provided always that the Senate, on the recommendation of the Executive Committee, concurred in by the Syndicate, may extend the term of appointment of a whole-time teacher to 65 years.

17. The procedure laid down in Sections 13 and 16(2) (b) relating to the appointment of teachers shall not, unless otherwise decided by the Senate, apply in the case of an extension of a teacher's appointment beyond the age of 60 or of the making permanent of an appointment which was temporary or for a short period or probationary in the first place but which was advertised as a possible permanent vacancy. Such renewals or extensions shall be made by the Senate on the recommendation of the Executive Committee and the Syndicate.

18. A Finance Committee for the Post-Graduate Department in Medical Science shall be appointed annually and shall consist of :—

- (i) The Vice-Chancellor
- (ii) The President, Council of Post-Graduate Teaching in Medical Science
- (iii & iv) Two members to be nominated by the Executive Committee of the Council of whom one shall be the Head of, or teacher in, a constituent college or a recognised institution
- (v) One member to be nominated by the Syndicate
- (vi) One member to be nominated by the Senate
- (vii) The Director of Health Services to the Government of West Bengal

If the same person holds more than one office under (i) and (ii) above, the Syndicate shall give necessary directions for appointment of a substitute member.

The Committee shall elect its own President each year. The Secretary of the Post-Graduate Department in Medical Science will be the Secretary of the Committee, *ex-officio*. Three members shall constitute a quorum.

It shall be the duty of the Committee to prepare the Budget Estimates of the Department after scrutinising the demands made by the Executive Committee. The Budget Estimates shall then be placed before the University Finance Committee for preparation of the consolidated Budget of the University in

its final form, provided always that in the case of constituent colleges or recognised institutions portions of the said Budget relating to such colleges or institutions shall have the concurrence of the relevant authority concerned.

All proposals involving new expenditure during the year (not covered by the Budget grants) shall be placed before the Committee for scrutiny. Such scrutiny shall involve consideration of the merits of different schemes as well as their financial implications. The recommendations of the Committee shall be placed before the University Finance Committee for submission to the Senate or other relevant authorities for sanction. No action shall be taken by the body concerned in respect of such proposals (except in cases of emergency) until after such sanction has been obtained.

The Finance Committee shall maintain a watch over the progress of income and expenditure as provided for in the Budget.

The Committee shall frame from time to time rules which shall be considered by the Executive Committee of the Council of Post-Graduate Teaching in Medical Science and, together with such observations thereon as the Executive Committee may make, shall be laid before the Senate for sanction.

#### SECRETARY

19. There shall be a salaried and whole-time Secretary to the Council of Post-Graduate Teaching in Medical Science and its Executive Committee. He shall be appointed by the Syndicate on the recommendations of the Council of Post-Graduate Teaching in Medical Science subject to confirmation by the Senate.

The Secretary shall be assisted by a permanent staff of subordinate Assistants and servants.

#### GENERAL

20. All persons other than University Professors, appointed under Section 3, shall be styled 'University Readers or University Lecturers' as the case may be.

21. The Board of Examiners in each subject for the Post-Graduate Medical Examinations shall consist of—

- (a) Internal Examiners, and
- (b) External Examiners.

The Internal Examiners in any subject shall be appointed by the Syndicate on the recommendation of the Executive Committee in consultation with the Board of Higher Studies

concerned from among such persons as have been appointed teachers under Section 3. The External Examiners shall be appointed by the Syndicate on the recommendation of the Executive Committee in consultation with the Board of Higher Studies concerned.

22. The names of all persons appointed University Professors, University Readers or University Lecturers shall be notified to the Government of West Bengal within one week from the date of the decision of the Senate. If, within six weeks from the receipt of such notification, Government intimate to the University that a specified appointment is objectionable on other than academic grounds such decision shall take effect and the appointment shall stand cancelled and the University may proceed to fill up the vacancy so caused in the manner indicated in the Regulations.

23. The Senate, on the recommendations of the Council shall, from time to time, frame rules, consistent with the Regulations, to facilitate the management of Post-Graduate Studies in Medical Science.

In particular, and without prejudice to the generality of the foregoing powers, such rules may—

- (a) define the duties of the President of the Council ;
- (b) provide for the appointment of a Vice-President of the Council and define his duties ;
- (c) provide for the appointment of a teacher as Director of Studies ;
- (d) provide that teachers appointed under clauses (a) and (b) of Section 3 be attached to a constituent college or a recognised institution in Calcutta or participate in the work of instruction of Under-Graduate students of constituent colleges, with the concurrence of the University, the colleges and the Teachers concerned ;
- (e) provide for the assignment of students to tutors and proctors and define their relation ;
- (f) regulate the conditions of residence of Post-Graduate students ;
- (g) provide that a Post-Graduate student may, with the permission of the Principal of the college from which he graduated, continue to be a member of such college and that his name may be borne on its rolls ;
- (h) provide for the due recognition of the association of a student with a constituent college or a recognised institution under the preceding clause or otherwise ;
- (i) provide for joint meetings of the Boards of Higher Studies and other Bodies in the University with the Executive

Committee of the Council of Post-Graduate Studies in Medical Science.

24. Every student of the Post-Graduate Classes shall be assigned by the Board of Higher Studies in his subject to a particular member of the staff as tutor. It shall be the duty of such tutors (in accordance with rules to be framed from time to time by the Senate on the recommendations of the Executive Committee considered by the Council) to see their pupils singly or in groups at stated times to advise them with regard to the lectures they should attend and to their courses of reading and practical work, and to assist them in any difficulties that they may encounter in their studies.

#### RULES OF PROCEDURE

25. The Council shall meet ordinarily four times a year and on other occasions when convened by the President.

Each Board of Higher Studies shall meet ordinarily four times a year and on other occasions when convened by the Chairman.

A special meeting of a Council shall be convened on the requisition of six members; a special meeting of the Executive Committee or of a Board of Higher Studies shall be convened on the requisition of three members.

26. At meetings of the Council and its Executive Committee, the President shall preside and at a meeting of a Board of Higher Studies the Chairman shall preside. In the absence of the President or Chairman, as the case may be, or when the office of President or Chairman is vacant, the members present shall elect a chairman for the occasion, provided always that the Vice-Chancellor and the President of the Council shall have the right to attend any of these meetings and address any of these Bodies of which they are not members but shall not exercise the right of vote.

27. Seven clear days' notice shall be given for the meetings of the Council and of the Boards of Higher Studies; five clear days' notice shall be given for meetings of the Executive Committee unless in case of emergency decided by the President and in his absence by the Vice-Chancellor.

28. Fifteen members of a Council shall constitute a quorum and the quorum of an Executive Committee or a Board of Higher Studies shall be the number representing one-third of the members in each case.

29. The rules for debate contained in Chapter I of the Regulations shall apply to meetings of the Council as far as practicable, but the Chairman of the meeting may relax their operation at his discretion.

30. The election of members of the Executive Committee (as contemplated by clause (7) of Section 6 and clause (b) of Section 8) shall take place at a special meeting, of which fifteen clear days' notice shall be given by the Secretary. Each member of the Council will on receipt of this notice be entitled to propose the name of one person for election to the Executive Committee. Such proposals must reach the Secretary seven clear days before the meeting. The Secretary shall cause a list of the nominees to be printed and forwarded to the members four clear days before the meeting. In any contested election, the voting shall be by ballot and the procedure shall be the same as that laid down in Sections 63-65 of Chapter I of the Regulations.

31. The procedure prescribed in the preceding section shall, *mutatis mutandis*, be followed in the election and co-option of members of Boards of Higher Studies (as contemplated by clause (b) of Section 8).

32. If by reason of death, resignation, or like cause, a vacancy occurs in the Council, Executive Committee, or Boards of Higher Studies, between the dates of two annual elections, the Body concerned shall forthwith fill up the vacancy and in such event the same procedure shall be followed as in the case of an annual election.

33. From the date of commencement of the Regulations contained in this Chapter, a fund shall be constituted for the promotion of Post-Graduate Studies in Medical Science to be called 'The Post-Graduate Medical Fund.' To such fund there shall be annually credited :—

- (a) Grants from Government
- (b) Benefactions made specially for this purpose by donors
- (c) Fees paid by students in the Post-Graduate Medical Classes
- (d) One-third of the fees realised from candidates for the Medical Examinations and
- (e) Such other sums as the Senate may allocate to it.

34. The powers conferred on the Council, Executive Committee and Boards of Higher Studies by the provisions of this Chapter shall be exercised by those bodies, respectively, in the manner and subject to the restrictions prescribed herein, and such power shall not be exercised by any other body or bodies in the University.

## CHAPTER XII

### ELECTION OF FELLOWS BY FACULTIES

The following procedure shall be adopted in the election of Ordinary Fellows by Faculties under Section 9 of the Indian Universities Act :—

1. Once in every year, on such date as the Chancellor may appoint in this behalf there shall, if necessary, be an election to fill any vacancy among the Ordinary Fellows elected by the Faculties. Such election shall take place at special meetings of the Faculties convened for the purpose.

2. An election under Regulation 1 shall be held, subject to such direction prescribing the qualifications of the persons to be elected as may, from time to time, be given by the Chancellor, with a view to securing, the return of duly qualified persons and the fair representation of different branches of study in the Senate.

3. Elections of Ordinary Fellows by the Faculties shall be made in such manner as to secure that not less than two-fifths of the whole number of Fellows elected by the Faculties shall be persons following the profession of education.

4. Names of candidates fulfilling the conditions prescribed under Regulation 2, must be proposed in writing by a Member of the Faculty which is to make the election. The nomination shall be in a form to be prescribed from time to time by the Syndicate, and shall reach the Registrar seven clear days before the date fixed for the election.

Each nomination must be accompanied by a brief written statement of the special qualifications of the nominee.

The Registrar shall cause a list of the nominees and the statements concerning them to be printed and forwarded to the Fellows concerned four clear days before the meeting.

5. The elections shall be held in accordance with Regulations 63, 64 and 65 of the Senate Regulations.

6. The election of any Fellow by a Faculty shall be subject to the approval of the Chancellor.

7. If, upon the election of an Ordinary Fellow by a Faculty, objection is taken that the election has not been held in accor-

dance with the Regulations framed for the purpose or the directions given by the Chancellor, written notice of such objection shall be given to the Registrar within three days after the election; such notice shall specify the ground upon which the validity of the election is questioned. The Registrar shall place the notice before the Vice-Chancellor or the Senior Ordinary Fellow of the Senate, as the case may be, who shall, thereupon, convene a meeting of the Senate for the consideration of the matter on as early a date as practicable. The Senate, if satisfied that the election has not been held in substantial compliance with the Regulations or the directions given by the Chancellor under Section 9, sub-section (2), may direct the Faculty to hold a new election or may give such other directions as may be necessary in the circumstances.

If notice of objection is given to the Registrar as provided by this Regulation, the name of the Fellow elected by the Faculty shall not be submitted to the Chancellor for approval under Section 6, sub-section (3) of the Indian Universities Act till the matter has been considered by the Senate.

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## CHAPTER XIII

### ELECTION OF FELLOWS BY GRADUATES

The following procedure shall be adopted in the election of Ordinary Fellows by Registered Graduates under Section 7 of the Indian Universities Act :—

1. Once in every year, on such date as the Chancellor may appoint in this behalf, there shall, if necessary, be an election to fill any vacancy among the Ordinary Fellows to be elected by Registered Graduates.

2. No person, unless his name has been entered in the Register of Graduates and unless he has paid the fee for the year in which the election takes place, shall be qualified to vote or to be elected at any election held under Regulation 1.

3. Intimation of the date fixed for election shall be sent to Registered Graduates at least thirty-five clear days in advance, and each Registered Graduate will, on receipt of the notice, be entitled to propose the name of one person for appointment as a Fellow. Such proposal must be accompanied by a brief written statement of the special qualifications of his nominee, and must reach the Registrar twenty-one clear days before the date fixed for election. It shall also be accompanied by a declaration signed by the candidate himself as assenting to the nomination.

Any candidate may withdraw his candidature by notice in writing subscribed by him, which must reach the Registrar seventeen clear days before the date fixed for election.

If the number of candidates who are duly nominated and who have not withdrawn their candidature in the manner and within the time specified above exceeds that of the vacancies, the Registrar shall cause a list of the nominees and of the statements to be printed and forwarded to the Registered Graduates fifteen clear days before the date fixed for election.

If the number of candidates is equal to the number of vacancies, the candidates shall be declared duly elected subject to the approval of the Chancellor.

4. Each voter shall have only one vote for each vacancy which is to be filled up and can give only one vote to any one candidate.

5. The votes shall be recorded and attested in such manner as the Syndicate may, from time to time, determine. The votes shall be recorded before the Registrar or reach him by such time on the day of election as the Syndicate may prescribe.

6. Those who obtain the highest number of votes will be declared elected. In the event of there being any tie between two or more candidates necessitating further selection, their names shall be reported to the Chancellor with whom the final selection shall rest.

7. The election of any Ordinary Fellow by the Registered Act VIII of 1904, Graduates shall be subject to the approval of Sec. 6 (3). the Chancellor.

8. If, upon the election of an Ordinary Fellow by Registered Graduates, objection is taken that the election has not been held in accordance with the Regulations framed for the purpose, written notice of such objection shall be given to the Registrar within three days after the election. Such notice shall specify the ground upon which the validity of the election is questioned. The Registrar shall place the notice before the Vice-Chancellor, or the Senior Member of the Syndicate, as the case may be, who shall, thereupon, convene a meeting of the Syndicate for the consideration of the matter on as early a date as practicable. The Syndicate, if satisfied that the election has not been held in substantial compliance with the Regulations, may direct the Graduates to hold a new election, or may give such other direction as may be necessary in the circumstances.

If notice of objection is given to the Registrar as provided by this Regulation, the name of the Fellow elected by the Graduates shall not be submitted to the Chancellor for approval under Section 6, sub-section (3) of the Indian Universities Act till the matter has been considered by the Syndicate.

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## CHAPTER XIV

### REGISTER OF GRADUATES

1. The Register of Graduates to be kept under Section 7 (2) of the Indian Universities Act shall be in such form as the Syndicate may from time to time prescribe.

2. The initial fee payable by a Graduate for having his name entered on the Register shall be Rs. 10.

3. The fee payable by a Graduate for having his name retained on the Register shall be Rs. 10 a year. The annual fee shall cover the period from the 1st of April in the year in which it is paid till the 31st of March in the year following. Till such fee has been paid no Graduate shall be entitled to take part in any election or to enjoy any of the privileges conferred by these Regulations.

4. When a Graduate applies to have his name entered on the Register after the expiry of the limited time prescribed under Section 7, sub-section (2) of the Indian Universities Act, he shall be liable to pay, in addition to the initial fee, a further sum of Rs. 10.

5. A Graduate whose name has been already entered on the Register may at any time compound for all subsequent payments of the annual fee by paying the sum of Rs. 150.

Act VIII of 1904,  
Sec. 7 (3).

6. The name of any Graduate entered on the Register shall, if the amount of the annual fee is not paid by the 30th June, be removed therefrom, but shall at any time be re-entered on payment of all arrears.

Act VIII of 1904,  
Sec. 7 (3).

7. The day of the Convocation on which a person is entitled to be admitted to his degree, shall be deemed the day on which he has graduated or taken his degree.

8. Registered Graduates shall have, besides the right of electing Ordinary Fellows, the following privileges :—

Act VIII of 1904,  
Sec. 7 (5).

(a) They shall be entitled to the use of the University Library on such special terms as may, from time to time, be prescribed by the Syndicate.

- (b) They shall be supplied with a copy of the University Calendar or such portions of it as the Syndicate may from time to time decide.
  - (c) They shall be admitted free to all lectures delivered by University Professors and Readers.
  - (d) They shall have priority of admission to the Convocation over unregistered Graduates.
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## CHAPTER XV

### REGISTER OF UNIVERSITY STUDENTS

1. The Registrar shall maintain a Register of all students of the University, including Graduates reading for a higher examination.

In this Register shall be entered the names of such persons only as have passed either the Entrance or the Matriculation Examination subject to the exception mentioned in Regulation 9 of this Chapter. There shall be recorded under the name of each registered student, the dates of admission to, and of leaving, any affiliated College, every pass or failure in a University Examination with his roll number, every University scholarship, medal or prize won by the student, and every degree taken.

2. No person shall be deemed a "University student" unless and until his name has been duly entered in the Register and none but "University students" shall be eligible for admission to any University Examination other than the Entrance or Matriculation.

3. The Principal of every affiliated College shall forward to the Registrar the name of every student of the College within fourteen days of his admission. The Principal shall, at the same time, if necessary, forward the registration fee required by Section 6.

When a student's name has been removed from the books of a College for any reason other than his having been sent up to a University Examination, the fact of its removal shall be immediately reported to the Registrar.

4. In the case of a student seeking registration, the Principal of the College to which he has been admitted, shall inform the Registrar of the date on which such student passed the Matriculation Examination and quote his roll number.

In the case of a registered student joining a College, the Principal shall quote such student's registered number.

5. On registration as a matriculated student every student shall be informed, through his Principal, of the registered number under which his name has been entered in the register, and that number shall be quoted in all subsequent reports concerning that student, and in all applications by that student to be admitted to a University Examination.

6. On matriculation every student shall be required to pay to the University a registration fee of two rupees, when his name is sent in by the Principal.

No further fee for registration shall be charged, unless a student's name is, on non-payment of fees, absence without notice or expulsion, struck off the books of a College, in which case he shall pay one rupee to have his name re-entered in the University Register.

7. All applications for admission to University Examinations shall be liable to be scrutinised by comparison with the University Register, and the Registrar may refuse any application of any candidate about whom complete particulars have not been reported, until he has forwarded through his Principal a complete statement of the particulars which have not been properly reported.

8. Any registered student may, at any time, receive a certified copy of all entries under his name on payment of three rupees.

9. Any person who applies for special permission to appear in an examination under the Regulations relating to non-collegiate students if he has been at any time matriculated in the University, shall quote his registered number or, if he has not been so matriculated, shall register his name as a matriculated student, paying the usual registration fee before he appears in the examination to which he seeks admission.

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## CHAPTER XVI

### NON-COLLEGIATE STUDENTS

1. No person who cannot produce a certificate from a College affiliated to the University to the effect that he has completed the course of instruction prescribed by the Regulations, shall ordinarily be admitted as a candidate at any University Examination other than an examination for Matriculation.

2. Exception may be made in certain cases on the recommendation of the Syndicate, by special order of the Senate. In each case the recommendation must state special reasons why the privilege should be granted. A certificate shall be produced in such form as may be prescribed by the Syndicate.

3. Except in very special cases no person shall be admitted under the preceding Regulation who has been enrolled as a regular student of a College during the twelve months previous to the date of the Examination at which he applies for permission to appear.

4. Before a candidate is permitted to present himself in any Science subject for which a practical course is necessary under the Regulations, he shall produce a certificate from the Principal of an affiliated College or some other authority approved by the Syndicate, to the effect that he has taken such a course in his Laboratory.

5. Employment as a teacher shall not be regarded as a ground of recommendation unless the applicant has been employed for at least three years preceding the Examination in the exercise of his profession in (1) a College affiliated to the University, or (2) a School recognised by the University as competent to send up candidates for the Matriculation Examination, or (3) any other school approved for the present purpose by the Syndicate.

6. Laboratory Assistants and Demonstrators and Librarians of affiliated Colleges shall be treated as teachers.

7. The Syndicate shall have power in any case to admit to any University Examination in any Faculty any person who shall present a certificate from any institution authorised to

grant certificates by the Governor-General of India in Council, or by a local Government, or from such other Institutions as may be from time to time recognised for the purpose by the Syndicate, showing that he has attended courses of study, passed examinations, or taken degrees equivalent to those which are required in the case of students of the Calcutta University.

8. All non-collegiate students before they are admitted to a University Examination, shall satisfy the Syndicate by the production of a certificate as to (a) their good conduct and (b) their diligent and regular study.

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## CHAPTER XVII

### FEMALE CANDIDATES

#### *General*

1. Female candidates, if they so desire, shall be examined in a separate place under the superintendence of ladies.

2. No female candidate shall be admitted to any examination without presenting a certificate in such form as may be prescribed by the Syndicate.

3. All the Regulations for the examination of candidates shall apply to female candidates except in so far as they are modified in the following Regulations or elsewhere :—

#### *Matriculation Examination*

Female candidates shall be allowed to take up any language accepted by the Syndicate as a second language.

#### *Intermediate Examination in Arts or Science*

(i) Female candidates may be admitted to this examination without studying in an affiliated College and Regulations 4 and 8 of Chapter XVI shall apply to them. No candidate, however, shall be allowed to present herself for this examination until two years have elapsed from the time of her passing the Matriculation Examination.

(ii) Female candidates shall be allowed to take up any language accepted by the Syndicate as a second language.

#### *B.A. Examination*

Female candidates may be admitted to this examination without studying in any affiliated College and Regulations 4 and 8 of Chapter XVI shall apply to them. But no candidate shall be allowed to present herself for this examination until two years have elapsed from the time of her passing the Intermediate Examination in Arts.

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## CHAPTER XVIII

### AFFILIATION AND DISAFFILIATION OF COLLEGES

1. Colleges or departments of Colleges may be affiliated in Arts or a department of Arts, and similarly in Science, Law, Medicine and Engineering. The affiliation shall be given specifically for each separate subject and each separate standard in each of the Faculties.

2. The privilege of affiliation can only be conferred by the Government on the report of the Syndicate and the Senate. All applications for affiliation must be addressed through the Registrar to the Syndicate.

3. Only Colleges working within the territorial limits defined by the Governor-General in Council under Section 27 of the Indian Universities Act, 1904, which are assigned to this University, will be affiliated.

4. In the case of a Government College, application must be made by the Director of Public Instruction of the province in which the Institution is situated.

In the case of any other Institution application must be made by the Governing Body and submitted through the chief controlling authority, if any.

5. Every application must be countersigned by two Members of the Senate.

6. A College applying for affiliation to the University shall Act VIII of send a letter of application to the Registrar, 1904, Sec. 21 (1). and shall satisfy the Syndicate—

- (a) that the College is to be under the management of a regularly constituted Governing Body on which the teaching staff is represented ;
- (b) that the character and qualifications of the teaching staff and the conditions governing their appointment and tenure of office are such as to make due provision for the courses of instruction to be undertaken by the College ;
- (c) that the buildings in which the College is to be located are suitable, and that provision will be made, in conformity with the Regulations, for the residence in the College or in lodgings approved by the College,

- of students not residing with their parents or guardians, and for the supervision and physical welfare of students ;
- (d) that due provision has been or will be made for a library ;
  - (e) where affiliation is sought in any branch of experimental science, that arrangements have been or will be made, in conformity with the Regulations, for imparting instruction in that branch of science in a properly equipped laboratory or museum ;
  - (f) that due provision will, so far as circumstances may permit, be made for the residence of the Head of the College and some members of the teaching staff in or near the College or the place provided for the residence of students ;
  - (g) that the financial resources of the College are such as to make due provision for its continued maintenance ;
  - (h) that the affiliation of the College, having regard to the provision made for students by other Colleges in the same neighbourhood, will not be injurious to the interests of education or discipline ; and
  - (i) that the College rules fixing the fees (if any) to be paid by the students have not been so framed as to involve such competition with any existing College in the same neighbourhood as would be injurious to the interests of education.

The application shall further contain an assurance that after the College is affiliated any transference of management and all changes in the teaching staff shall be forthwith reported to the Syndicate.

The application shall also contain an assurance that, except with the special permission of the Syndicate, no College Professor or Lecturer will be allowed to lecture to a class or section of a class which has on its rolls more than 150 students, and if two classes are combined, the joint number on the rolls shall likewise not exceed 150.

If any application for special permission is made the Syndicate in dealing with it shall have regard to—

- (a) the nature of the subject ;
- (b) the structure of the lecture-room and its accommodation ;
- (c) the qualifications of the lecturer.

In the case of every application for affiliation of a College in any subject for the examination of the degree of Master in the Faculty of Arts or of Science, a guarantee must be given

that the course in which affiliation is sought will be adequately maintained for a period of at least four years.

Act VIII of 1904, Sec. 7. On receipt of a letter of application  
21 (2), (3) and (4). the Syndicate shall—

- (a) direct a local inquiry to be made by a competent person authorized by the Syndicate in this behalf;
- (b) satisfy themselves that there is in the College building adequate accommodation both as regards the number of class-rooms, and the floor space and cubic space in each class-room;
- (c) make such further inquiry as may appear to them to be necessary; and
- (d) report to the Senate on the question whether the application should be granted or refused, either in whole or in part, embodying in such report the result of any inquiry under clauses (a), (b) and (c).

And the Senate shall after such further inquiry (if any) as may appear to them to be necessary, record their opinion on the matter.

The Registrar shall submit the application and all proceedings of the Syndicate and the Senate relating thereto to the Government, who, after such further inquiry as may appear to them to be necessary, shall grant or refuse the application or any part thereof.

When the application or any part thereof is granted, the order of Government shall specify the courses of instruction in respect of which the College is affiliated, and when the application or any part thereof is refused, the grounds of such refusal shall be stated.

8. An application for affiliation may be withdrawn at any  
Act VIII of 1904, time before an order has been passed on the  
Sec. 21 (5). application by the Government.

9. Where a College desires to add to the courses of ins-  
Act VIII of 1904, truction in respect of which it is affiliated, the  
Sec. 22. procedure prescribed by Regulations 6 and 7  
shall, so far as may be, be followed.

10. As a condition of the continuance of affiliation each  
Act. VIII of 1904, affiliated College will be inspected from  
Sec. 23 (2). time to time by one or more competent  
persons authorised by the Syndicate in that behalf.

11. The Syndicate may call upon any College so inspected to  
Act VIII of 1904, take, within a specified period, such action  
Sec. 23 (3). as may appear to them to be necessary in  
respect of any matter referred to in Regulation 6.

12. The Senate may, on the recommendation of the Syndicate, submit for the orders of the Government at any time, a proposal for the withdrawal of the privileges of affiliation from any College.

The procedure shall be as follows :—

(a) A member of the Syndicate who intends to move that Act VIII of 1904, the rights conferred on any College by affiliation Sec. 24 (1)-(6). be withdrawn, in whole or in part, shall give notice of his motion, and shall state in writing the grounds on which the motion is made.

(b) Before taking the said motion into consideration, the Syndicate shall send a copy of the notice and written statement mentioned in (a) to the Head of the College concerned, together with an intimation that any representation in writing submitted within a period specified in such intimation on behalf of the College will be considered by the Syndicate :

Provided that the period so specified may, if necessary, be extended, from time to time, by the Syndicate.

(c) On receipt of the representation or on expiration of the period referred to in (b), the Syndicate, after considering the notice of motion, statement and representation, and after such inspection by any competent person authorised by the Syndicate in this behalf, and such further inquiry as may appear to them to be necessary, shall make a report to the Senate.

(d) On receipt of the report under (c), the Senate shall, after such further inquiry (if any) as may appear to them to be necessary, record their opinion on the matter.

(e) The Registrar shall submit the proposal and all proceedings of the Syndicate and the Senate relating thereto to the Government, who, after such further inquiry (if any) as may appear to them to be necessary, shall make such order as the circumstances may, in their opinion, require.

(f) Where by an order made under (e) the rights conferred by affiliation are withdrawn, in whole or in part, the grounds for such withdrawal shall be stated in the order.

13. If a College affiliated in any subject for the M.A. or M.Sc. standard fails to maintain adequately for a period of four years the course in that subject, proceedings shall be taken, under the preceding section, to withdraw from the College the privileges of affiliation in that subject.

14. Each affiliated College shall furnish such returns, Act VIII of 1904, reports and other information as the Syndicate may require, to enable them to judge of the efficiency of the College.

## CHAPTER XIX

### CONDITIONS TO BE FULFILLED BY COLLEGES AFFILIATED UNDER ACT II OF 1857

1. Every College affiliated to the University before the passing of the Indian Universities Act, shall be entitled to exercise the rights conferred upon it by affiliation, till such rights are withdrawn or restricted in the exercise of any power conferred by that Act or by the Act of Incorporation.

Act VIII of 1904, Sec. 20.  
For this purpose all Colleges affiliated up to the standard of the First Examination in Arts will be deemed qualified to impart instruction up to the standard of the Intermediate Examination in Arts, but not up to that of the Intermediate Examination in Science.

2. As soon as practicable after the date on which these Regulations come into force, the Syndicate shall cause steps to be taken for the withdrawal of the rights conferred by affiliation from all Colleges situated beyond the territorial limits of the University as defined by the Governor-General in Council under Section 27 of the Indian Universities Act.

For this purpose, the Syndicate shall ascertain whether any such College is preparing students for any examination of this University; and the date on which the withdrawal of the rights conferred by affiliation will take effect as regards any particular College shall be so regulated as not to prejudice the right of any student to appear at the examination for which he is actually reading in that College.

3. As soon as practicable after the date on which these Regulations come into force, the Registrar shall forward a copy thereof to the authorities of each affiliated College situated within the territorial limits of the University as defined by the Governor-General in Council under Section 27 of the Indian Universities Act, and invite them to furnish, within three months (or such further time as may be prescribed in any case by the Syndicate), information upon the following points:—

- (a) Whether the College is under the management of a regularly constituted governing body; if so, the names of its members and its constitution.

- (b) The names and qualifications of the teaching staff together with copies of their testimonials, and the conditions governing their appointment and tenure of office.
- (c) The size and situation of the College building, including the floor space and cubic space in each class-room.
- (d) Provision, if any, made for the residence of such of the students as do not reside with their parents or guardians.
- (e) Provision made for the residence of the Head of the College and of any member of the teaching staff, in or near the College or the place provided for the residence of the students.
- (f) Provision made for the supervision and physical welfare of the students.
- (g) Provision for a library, and the facilities given to students to make use of the library.
- (h) The courses of study, the subjects taught, the routine of work, and the arrangements for exercises and for tutorial assistance.
- (i) The courses of study which the College proposes to undertake in accordance with these Regulations, and the provision which will be made for such courses.
- (j) Where the College proposes to undertake instruction in any branch of experimental Science, what arrangements will be made for imparting instruction in that branch of Science in a laboratory or museum (i) by the delivery of lectures illustrated by experiments, and (ii) by enabling students to carry on practical work.
- (k) The financial resources of the College.
- (l) The College rules fixing the fees, if any.

4. If it appears in the case of any College that it has no regularly constituted governing body, or that it has a governing body upon which the teaching staff is not represented, the Syndicate shall call upon the chief controlling authority to place the College forthwith under the management of a regularly constituted governing body on which the teaching staff is represented.

5. The Syndicate shall obtain from each College an assurance—

- (a) that any transference of management and all changes in the teaching staff will be forthwith reported to the Syndicate, and

- (b) that from the beginning of the session following that in which these Regulations come into force, except with the special permission of the Syndicate, no Professor or Lecturer will be allowed to lecture to a class or section of a class which has on its rolls more than 150 students, and if two classes are combined the joint number on the rolls shall likewise not exceed 150.

6. The Syndicate shall cause each College referred to in Regulation 3, to be inspected in accordance with the Regulations framed in that behalf, and call upon the College Act VIII of 1904, inspected to take within a specified period Sec. 23 (3). (which may be extended from time to time at the discretion of the Syndicate) such action as may appear to them to be necessary with a view to securing its efficiency.

7. At the end of two years from time to time when these Regulations come into force, the Syndicate shall submit to the Senate a report upon the condition of each affiliated College with a recommendation as to the subjects and standard in which such College shall be deemed to be affiliated. The matter shall be dealt with in accordance with the provisions of Section 24 of the Indian Universities Act, and a report submitted to the Government, who may make such order as the circumstances of each case may require.

8. Each affiliated College shall furnish such returns, reports and other information as the Syndicate may require to enable them to judge of the efficiency of the College.

9. The preceding Regulations shall not apply to the school departments of affiliated Colleges.

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## CHAPTER XX

### INSPECTION OF AFFILIATED COLLEGES

1. The inspection of Colleges shall be conducted jointly by the Inspector of Colleges and by one or two other persons who shall, from time to time, be appointed by the Syndicate to assist in the inspection of a College or a group of Colleges.

In the case of inspection of Colleges affiliated in Arts or Science, the additional Inspector or Inspectors shall be so chosen that both branches of study are represented, if necessary. In the case of Colleges affiliated in any branch of professional learning, the additional Inspector or Inspectors shall be specially qualified in that subject.

2. All Colleges shall be inspected once within eighteen months after the date when these Regulations come into operation. Thereafter every College shall be inspected at least once a year.

3. The report of the Inspectors shall deal with the following among other matters :—

- (a) The constitution of the governing body and the names of its members.
- (b) The suitability of the buildings and their neighbourhood, the accommodation for the students in attendance, the furniture, the lighting, ventilation of the rooms, the drainage of the surrounding premises and the efficiency of the sanitary arrangements.
- (c) The names and qualifications of the teaching staff, the conditions governing their appointment and tenure of office, and the changes in the staff during the preceding year.
- (d) The provision made for the residence of the Head of the College and of the members of the teaching staff in or near the College, or the place provided for the residence of students.
- (e) The adequacy of the Library, scientific apparatus and other teaching appliances.
- (f) The courses of study, the subjects taught, the number of lectures delivered in each subject, the routine of work and the arrangements for exercises and for tutorial assistance and the facilities given to students to make use of the Library.

- (g) The adequacy of the teaching staff.
- (h) The strictness with which the College registers are kept and the transfer rules observed.
- (i) The average monthly roll-number and the daily attendance of students during the last twelve months, as compared with the previous years.
- (j) The results of University examinations.
- (k) The state of discipline.
- (l) The provision made for physical exercise.
- (m) College clubs and other institutions for fostering Collegiate life.
- (n) The extent and character of hostel accommodation, the degree of efficiency attained in the supervision of hostels and other lodging for students; and the distance of such hostels and lodgings from the College premises.

4. The following books shall be kept by every College :—

- (a) An admission register, in such form as the Syndicate may from time to time prescribe.
- (b) An attendance register.
- (c) A students' conduct register showing fines exacted and other punishments.
- (d) A register of the results of periodical examinations and class exercises.
- (e) A register of Transfer Certificates issued and received.
- (f) A cash-book.
- (g) A book containing the proceedings of the governing body.

5. All the accounts, books, and other records of a College shall at all times be open to inspection and examination by any person or persons who may be deputed by the Syndicate for the purpose, provided that any information obtained from the inspection of the accounts shall be deemed confidential.

6. No inspection or examination under these Regulations shall have reference to religious instruction.

7. Every College shall furnish annually a return in such form as the Syndicate may from time to time prescribe.

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## CHAPTER XXI

### RECOGNITION OF SCHOOLS AND WITHDRAWAL THEREOF

1. A school situated within the local limits assigned to the University of Calcutta by the Governor-General in Council under Section 27 of the Indian Universities Act, 1904, which is desirous of being recognised as a school competent to present candidates for the Matriculation Examination, shall send a letter of application to the Registrar.

2. The school shall furnish a preliminary statement showing :—

(a) That the school is under the management of a regularly constituted committee on which the teaching staff is represented, that proper provision is made for the continuance of the existence of such committee, and that the rules are such that the committee can exercise a necessary amount of control over the working of the school.

(b) That the qualifications, character and experience of the Head Master and the rest of the teaching staff are satisfactory, that due provision is made in respect of the number of teachers, and otherwise for carrying on all the courses of instruction in which the school desires to be recognised by the University as competent to present candidates for the Matriculation Examination, and that the conditions governing the tenure of the office of the Head Master and his staff are such as to render proper continuity of work possible.

(c) That the buildings in which the school is carried on are adapted for the purpose of a school and are in proper sanitary condition, that the surroundings are suitable, and that the arrangements made in the buildings and in the furnishing of them are not likely to injure in any way the eyesight and general health of the pupils.

(d) That the accommodation is sufficient for the classes under instruction in the school.

(e) That the sanitary conveniences attached to the school are adequate and are kept in good order.

(f) That arrangements are made for the supply of good drinking water to the pupils, and that facilities are provided to allow them to partake of refreshments.

(g) That due provision is made for the maintenance of a library and for lending out appropriate books (not school text-books) for the use of pupils.

(h) That when recognition is sought in any branch of work, such as experimental science (1) which involves lectures which should be experimentally illustrated or (2) which involves the students themselves doing practical experimental work, the apparatus and the facilities provided for the purpose are sufficient to carry out these objects properly and fully.

(i) That when any subject proposed to be taught requires, for its proper understanding to be illustrated by special appliances, *e.g.*, the subject of Geography by maps and models, and the science subjects by a collection of objects or collections in the form of a museum, such provision has been made.

(j) That the school authorities have made provision to ensure discipline and good conduct among the pupils, both within and without the school premises, and that there are suitable arrangements for their recreation.

(k) That when pupils are not resident with either parents or guardians, the school authorities will insist on such students living either in a hostel or a mess which is duly inspected and placed under the control of some person responsible to the Head Master of the school for the discipline and well-being of such pupils.

(l) That no teacher is allowed to teach—

- (i) in the Entrance Class or Second Class or any section thereof, more than 50 pupils at the same time ;
- (ii) in any of the classes from Third to the Sixth, or any section thereof, more than 40 pupils at the same time ;
- (iii) in either the Seventh or Eighth Class, or any section thereof, more than 30 pupils at the same time.

(m) That the school authorities have made adequate arrangements for giving a course of physical training to all pupils unless exempted by the Syndicate for any special reason.

2(A). Every school shall be required to make arrangements for imparting training for a specified period according to a prescribed syllabus, and under an approved teacher, in at least one of the following subjects :—

- (a) Agriculture and Gardening ;
- (b) Carpentry ;
- (c) Smithery ;
- (d) Book-keeping ;
- (e) Spinning and Weaving ;
- (f) Tailoring and Sewing ;
- (g) Music ;
- (h) Basket-making ;
- (i) Telegraphy ;

- (j) Needlework ;
- (k) Drawing and Painting including an appreciation of Fine Arts ;
- (l) Cookery.

Such other subject as may, from time to time, be prescribed by the Syndicate.

The Syndicate shall, from time to time, frame rules for specification of the period of training, preparation of syllabus, and recognition of teachers.

The Syndicate may suspend the operation of this section in the case of schools which may be unable, by reason of financial stress or otherwise, to comply with the requirements of the University.

3. The Syndicate shall also require full information as to the financial position of the school and must be satisfied that its financial stability is assured. Information obtained on this head shall not be published.

4. The Syndicate shall also require full information as to the reasons for the establishment of the school, and as to the number of schools of the same standard which exist in the neighbourhood of the proposed school, and it must be shown that the establishment and recognition of the school will not be injurious to the interests of education and discipline.

5. The Syndicate shall also require full information as to the fees, if any, which it is proposed to levy in the school.

6. The Syndicate shall require a school, as a condition of its recognition, to send in to the University once in each year, at such time as the Syndicate may prescribe, a short general report of the working of the school, together with a list of the staff of the school, and of any changes which may have taken place in the staff in the course of the preceding year.

The Syndicate shall also require that at the same time an abstract of the actual annual income and expenditure of the school shall be submitted, and shall insist that the remuneration of the teachers shall be on a reasonable scale and that the other expenditure shall be sufficient to maintain the school in efficiency.

The Syndicate shall also obtain an assurance that any transference of management and all changes in the teaching staff will be forthwith reported to the Syndicate.

7. On receipt of the letter of application for recognition, and of all such information as the Syndicate may consider to be necessary to establish a presumptive claim for the recognition of the school, the Syndicate shall call for a report on the points dealt with in Regulations 2-5 inclusive from a competent Inspector, and for this purpose the personal report of the

Government Inspector of Schools of the Division in which the school is situated shall usually be considered to be sufficient.

This shall not, however, prevent the Syndicate from calling for special reports by any properly qualified person or persons or any or all of the foregoing points.

Should the person deputed be an Inspector of Schools his report shall ordinarily be submitted through the Director of Public Instruction of the Province in which the school is situated with such remarks as the Director thinks it necessary to make.

8. On receipt of all the required information, the Syndicate shall decide whether the school shall be recognised or not, and if recognised, the exact courses in which such school may submit candidates for the Matriculation Examination shall be stated in the letter of recognition. If a recognised school desires to add to the courses of instruction in respect of which it is recognised, the procedure described in Regulations 2-7 shall, so far as may be necessary, be followed.

9. One of the conditions of recognition, or of the continuance of recognition of a school already recognised shall be that it shall submit to periodic inspection by a person or persons deputed by the Syndicate from time to time. It is desirable that such inspection takes place at least once in each school year, and that copies of the inspection reports should be duly communicated to the University by the person or persons so deputed after each such inspection.

9(A). One further condition of recognition or of continuance of recognition of a school already recognised shall be that Vernacular shall be the medium of instruction in all subjects other than English, subject to such exceptions granted by the Syndicate in general accordance with the provisions of Section 7, Chapter XXX of the Regulations.

9(B). Within five years from the date on which these Regulations come into force every school with eight classes shall have at least two teachers on its staff who have obtained the M.A. degree in English or Philosophy or History or Political Economy and Political Philosophy or the B.A. degree with Honours in these subjects or the B.T. degree or the L.T. Diploma or the Diploma in Spoken English or English Teachership Certificate mentioned in Chapter XL-B of the Regulations or the Teachers' Training Certificate with English as a special method subject, or have obtained recognition as teacher in English under Section 9(C). When in a school more sections than one are opened in the four top classes, the number of such qualified teachers shall be increased in a reasonable proportion.

9(C). (i) Head Masters of recognised schools who have taught English on 31st March, 1935, will be recognised as teachers in English.

(ii) Assistant Head Masters and Assistant Teachers who have taught English in a recognised school or schools for at least five years on 31st March, 1935, will also be recognised as teachers in English :

Provided that until such date as the Syndicate may prescribe Head Masters, Assistant Head Masters and Assistant Teachers who have taught English in a recognised school or schools for at least five years before 31st March, 1935, may also be recognised as teachers in English although they may not have been teachers of English in a recognised school on 31st March, 1935, if they are employed as such at the time when they apply to the University for recognition.

(iii) A register containing the names of Head Masters, Assistant Head Masters and Assistant Teachers referred to in sub-sections (i) and (ii) above shall be maintained by the University.

9(D). Three years after these Regulations have come into force no teacher of a recognised school shall be allowed to teach English in any of the classes unless he is qualified to do so under Section 9(B).

9(E). No school shall be allowed to send up candidates for the Matriculation Examination if Class X has been opened without the permission of the University.

10. It shall be competent to the Syndicate at any time to withdraw the privilege of recognition granted under these Regulations or granted under any rules previously in existence, for any one of the following reasons :—

- (a) If a school on an average of three years fails to pass 33 per cent. of the candidates sent up for the Matriculation Examination.
- (b) If the reports of inspections received show that the school is no longer worthy of recognition.
- (c) If it is found that the conditions which were considered essential to the recognition of the school in the first instance and which obtained when the school was placed on the University list are no longer fulfilled.
- (d) For any other reason considered to be sufficient by the Syndicate, the reason to be specified and recorded.

No action shall be taken on (b), (c) or (d) of Regulation 10 without giving the School Committee an opportunity of stating its own case.

In reference to (a) the following procedure shall be adopted :—

- (i) In each year, immediately after the results of the Matriculation Examination have been published, the

Registrar shall prepare a list of the schools which on the average of the three preceding examinations (including that just ended) have failed to pass 33 per cent. of the candidates sent up for examination.

- (ii) Such schools shall be warned before the end of July, that if they continue in future years to show unsatisfactory results, their names will be struck off the list of recognised schools.
  - (iii) In the year following such warning, if it is found, after the results of the Matriculation Examination have been declared, that any of the warned schools has again passed less than 33 per cent. of the candidates sent up, the privilege of sending up candidates to the Matriculation Examination shall be liable to be withdrawn from it. In this case notice of withdrawal of the privilege shall be issued by the Registrar not later than the 15th of July of each year, and shall take effect after the Matriculation Examination next following.
  - (iv) If, on the results of the fourth year so considered, the percentage of passes in any such warned school amounts to 33 per cent. no action shall be taken.
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## CHAPTER XXII

### CONDITIONS TO BE FULFILLED BY SCHOOLS NOW RECOGNISED

1. Every school recognised by the University, at the time when these Regulations come into force, shall be entitled to exercise the rights conferred by recognition, till the privileges of recognition are withdrawn in the manner provided in Regulation 10 of Chapter XXI.

For this purpose, every school recognised as qualified to present candidates for the Entrance Examination shall be deemed qualified to present candidates for the Matriculation Examination in all subjects other than Geography and Elementary Mechanics, but no such school shall, without the special permission of the Syndicate, send up candidates for examination in either of these subjects.

If an application for special permission to take up either of these subjects is made, the Syndicate, before granting it, shall satisfy themselves that the school is provided with the necessary appliances and can make proper arrangements for teaching that subject.

2. As soon as practicable after the date on which these Regulations come into force, the Syndicate shall withdraw the privileges of recognition from all recognised schools situated beyond the territorial limits of the University as defined by the Governor-General in Council under Section 27 of the Indian Universities Act. Such withdrawal shall take effect from a specified date not later than the 30th of April, 1907.

3. As soon as practicable after the date on which these Regulations come into force, the Registrar shall forward a copy thereof to the authorities of each recognised school situated within the territorial limits of the University as defined by the Governor-General in Council under Section 27 of the Indian Universities Act, and invite them to furnish within three months (or such further time as may be prescribed in any case by the Syndicate), information upon the following points :—

- (a) Whether the school is under the management of a regularly constituted committee, on which the teaching staff is represented ; whether proper provision is made

for the continuance of the existence of such committee, and whether the rules are such that the committee can exercise a necessary amount of control over the working of the school.

- (b) Whether the qualifications, character and experience of the Head Master and the rest of the teaching staff are satisfactory, whether due provision is made in respect of the number of teachers and otherwise for carrying on all the courses of instruction in which the school is recognised, and whether the conditions governing the appointment and tenure of office of the Head Master and the rest of the staff are such as to render proper continuity of work possible.
- (c) Whether the buildings in which the school is situated and in which the instruction is carried on are adapted for the purposes of a school, and are in proper sanitary condition; whether the surroundings are suitable and the arrangements made in the buildings and in the furnishing of them are likely to injure in any way the eyesight and general health of the pupils.
- (d) Whether the accommodation is sufficient for the classes under instruction in the school.
- (e) Whether the sanitary conveniences attached to the school are adequate and kept in good order.
- (f) Whether arrangements are made for the supply of good drinking water to the pupils, and facilities are provided to allow them to partake of refreshments.
- (g) Whether provision is made for the maintenance of a library and for lending out appropriate books (not school text-books) for the use of students.
- (h) Whether the school intends to undertake instruction in Geography or Elementary Mechanics; if so, whether the appliances and facilities provided are adequate.
- (i) Whether provision is made to ensure discipline and good conduct among the pupils, both within and without the school premises, and whether arrangements are made for their recreation.
- (j) Whether in the case of pupils who do not reside with parents or guardians, provision is made for their residence in lodging inspected by and under the control of some person responsible to the Head Master for the discipline and well-being of such pupils.
- (k) Whether the remuneration of the teachers is on a reasonable scale.

- (l) The financial resources of the school, and actual annual income and expenditure for the last three years.
- (m) The fees, if any, levied in the different classes of the school.
- (n) The courses of study, the subjects taught, the routine of work, and the arrangements for exercises and for tutorial assistance.

4. If it appears in the case of any school that it has no regularly constituted committee, or that it has a committee upon which the teaching staff is not represented, the Syndicate shall call upon the chief controlling authority to place the school forthwith under the management of a regularly constituted committee on which the teaching staff is represented.

5. The Syndicate shall obtain from each school an assurance—

- (a) that any transference of management and all changes in the teaching staff will be forthwith reported to the Syndicate ;
- (b) that after the expiry of twelve months from the date on which a copy of these Regulations is forwarded to the chief controlling authority of the school, no teacher will be allowed to teach
  - (i) in the Entrance Class or Second Class or any section thereof, more than 50 pupils at the same time ;
  - (ii) in any of the classes from the Third to the Sixth, or any section thereof, more than 40 pupils at the same time ;
  - (iii) in either the Seventh or the Eighth Class, or any section thereof, more than 30 pupils at the same time ;
- (c) that as a condition of the continuance of recognition, the school will submit to regular and periodic inspection by a person or persons deputed by the Syndicate from time to time ; and
- (d) that a short general report of the working of the school together with an abstract of its actual annual income and expenditure will be submitted once a year at such time as the Syndicate may prescribe.

6. The Syndicate shall call upon each school referred to in Regulation 3 to take within a specified period (which may be extended from time to time at the discretion of the Syndicate) such action in respect of any of the matters mentioned in Regulations 3, 4 and 5, as may appear to them to be essential for its efficiency. Upon failure of the school to take the necessary action, after it has been given reasonable opportunity to do so, it shall be liable to have the privileges of recognition restricted or withdrawn, as the circumstances of the case may

require. No order, however, shall be made by the Syndicate in this behalf except upon a personal report on the condition of the school at the time, by a competent person deputed for the purpose, and after giving the School Committee an opportunity of stating its own case.

7. The preceding Regulations shall apply to the School Departments of Affiliated Colleges.

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## CHAPTER XXIII

### ADMISSION, TRANSFER AND WITHDRAWAL OF STUDENTS

1. Those Regulations shall apply only to Colleges affiliated in Arts, Science and Law.

2. At their Annual Meeting the Senate shall appoint a Committee of five Fellows, to be called the Transfer Committee, who shall deal with all questions referred to them in accordance with the following Regulations.

Two members of the Committee and two only shall be persons not connected with any affiliated College.

The proceedings of the Committee shall be submitted every month to the Syndicate for confirmation, and the Syndicate may approve, revise or modify the decision of the Committee on any matter, or direct the Committee to review it. Three members shall form a quorum. In the event of a vacancy occurring between two Annual Meetings of the Senate it shall be at once filled up by the Syndicate.

#### *Admissions*

3. Admission of students to Affiliated Colleges shall ordinarily be allowed only at the commencement of an academical year. If a student applies to a College for admission after 31st July or such other date as the Syndicate may fix in this behalf in any academical year, his case, unless he brings a Transfer Certificate, shall be referred to the Transfer Committee for decision as to whether he may be permitted to join such College.

4. If a student who has passed the Matriculation, or the Intermediate in Arts or Science, or the B.A. or B.Sc. Examination, applies for admission to a College, without having previously joined any other College, he may be admitted upon production of his University Certificate. A student whose name appears in the gazetted list of candidates who have passed one of the aforesaid University Examinations may be provisionally admitted without a certificate, on condition of his producing the certificate within a reasonable time.

5. If a student has been sent up to a University examination, and has either not appeared, or has failed at such examination, he may, on production of the Registrar's receipt, be admitted to any College. The fact of his admission, with the date, shall be written across the face of the receipt.

6. If a student has failed, he shall produce a certificate showing the subject or subjects in which he has failed, which certificate the Registrar shall be bound to furnish within two days after payment of a fee of four annas.

7. A student will be recognised as admitted to a College as soon as he has been accepted by the Principal, and has, where fees are required by the College, paid his admission and first month's fee.

8. When a student has been admitted to an affiliated College, he shall be considered to belong to that College until—

- (a) the end of the academical year in which he has been sent up to a University examination, or
- (b) the date borne on his Transfer or Withdrawal Certificate, or
- (c) he has given notice of withdrawal, or
- (d) his name has been struck off the College books for absence without notice or for non-payment of College fees, or
- (e) he has been expelled.

#### *Transfers*

9. If a student has once been admitted to an affiliated College under Regulation 4 or Regulation 5, he shall not, except as otherwise provided, be subsequently admitted to any other affiliated College, without the production of a Transfer Certificate from the Principal of the College in which he has last been reading.

10. When a student has been admitted into a College, he shall not ordinarily be allowed to take a transfer to any other College except at the end of an academical year.

11. Application for a Transfer Certificate must be made by letter to the Principal of the College. It must be signed by the applicant and countersigned by the applicant's parent or guardian.

12. If application is made at the close of an academical year, the only ground on which it can be refused is the failure to pay the sums due to the College, including tuition fees, and fines and transfer fee, if any. If it is so refused the ground of refusal shall be notified in writing to the applicant, who shall have the right of appeal to the Transfer Committee.

13. If a student applies for transfer, against whose name "gross misconduct" has been entered in the University Register of Students, this fact shall be noted in his Transfer Certificate.

14. If a student applies for transfer at any time other than at the end of an academical year on the ground of (1) transfer

of his parent or guardian from the station at which the first College is situated, or (2) desirability of a change of climate and station on the ground of health, duly certified by proper medical evidence, or (3) any other good and sufficient reason, the Principal may grant him a transfer. If the Principal is of opinion that the application for transfer ought not to be granted, he shall, if the student so desires, at once refer the case to the Transfer Committee, stating his grounds of objection.

15. Transfer Certificates under the previous Regulation shall only be issued once a month, except in cases of urgency. The ordinary date of issue shall be the last day of the month, or if this day falls within a vacation or on a holiday, the next preceding working day.

16. A student desiring a Transfer Certificate under Regulation 14 shall submit his application not less than 10 days before the authorised date of issue. Not less than three days before the latter date he shall be informed whether his application has been granted and in that case he shall be furnished with a statement of all the sums due by him to the College. If these dues are paid by him on or before the authorised date of issue, he shall receive his Transfer Certificate on that date.

17. If, owing to the intervention of holidays or some unforeseen contingency, it is found impossible, in accordance with the conditions laid down, to issue the Certificate on the last day of the month or the next preceding working day, the certificate shall be issued as soon after as possible, the same notice as specified above being given to the applicant with regard to the sums due by him. The date borne on the Transfer Certificate shall be that of the last day of the month for which the transfer is desired, except in cases of urgency, where the date of the certificate shall be the date of issue.

18. If the student does not pay the sums due by him within the time specified above, he shall not be entitled to his Transfer Certificate until the last day of the month in which he pays his dues, or the corresponding day preceding a vacation or holiday.

19. If application is made for a Transfer Certificate after the commencement of a vacation exceeding fifteen days and extending beyond the last day of the month in which it commences, the certificate, if granted, shall bear the date of the last day of such vacation if this coincides with the last day of a month; otherwise, it shall bear the date of the last day of the preceding month. The student applying for transfer shall submit his application at least six days before and shall receive his certificate, if granted, not later than five days after the end of the vacation. He shall before the issue of the certificate

receive at least three days' intimation of the sums due by him to the College from which he desires transfer, and if these dues are not paid within this time the issue of the certificate shall be deferred in accordance with Regulation 18.

20. All fees for the month corresponding to the date borne on the Transfer Certificate shall be paid to the College from which the transfer is taken, and fees shall likewise be paid to the same College for an additional month if the application for transfer is made before a vacation which commences not more than one month after, and which extends more than one month beyond the date on the certificate. The fact of the payment of such additional fees shall be duly entered on the certificate, and unless a student takes admission to another College within a month of the date of his Transfer Certificate he shall not be liable to pay these fees at the second College.

21. In all cases, a student shall remain on the books of the College from which he seeks a transfer until the date borne on the Transfer Certificate, and his attendance at lectures shall be reckoned up to and including that date.

22. The Transfer Certificate shall be in such form as the Syndicate may from time to time prescribe.

23. A student shall be liable to pay a transfer fee before obtaining his certificate. The transfer fee shall not (except under special orders of the Transfer Committee in the case of Colleges in which no fees are charged) exceed the ordinary monthly fee of the class.

24. If a student applies for transfer who has failed to submit the exercises required of him, or to give satisfaction at the periodical examinations, the fact shall be noted on the Transfer Certificate.

25. If a student applies for transfer who has been refused permission to appear at a University Examination, the fact of such refusal, with the reasons, shall be noted on the Transfer Certificate.

26. If a student applies for transfer who has not been permitted to continue his studies in the College owing to his non-appearance or failure at the College examinations, or who has not been allowed promotion, the fact shall be noted on the Transfer Certificate and he shall not be admitted into a higher class in another College within twelve months.

26A. A Principal may, without assigning any reason, require a student to leave the College if he considers such action necessary in the interest of the institution. He shall in such a case issue a *Transfer Certificate* (in a form prescribed by the Syndicate) *in his favour free of charge*. The certificate shall not be issued under this section without the previous approval of the governing body of the College.



Action taken under this section shall be reported to the University.

### *Leaving Certificate*

27. A student temporarily or permanently ceasing his studies may claim a Leaving Certificate, which shall be in the same form as a Transfer Certificate, and for which the same fee, if any, shall be paid.

28. The Principal of a College may accept a Leaving Certificate in lieu of a Transfer Certificate in a session subsequent to that in which it was issued, but not in the same session. Such certificate shall be presented at the beginning of the session, and the student shall ordinarily read from the beginning for the full academical year. But by special leave of the Syndicate the lectures in the College then entered may be reckoned from the day and month corresponding to the date on which the student's connection with his former College ceased.

29. The only grounds on which a Leaving Certificate can be refused are (1) gross misconduct, (2) failure to pay the sums due to the College.

30. If a student gives notice of withdrawal from a College without applying for a Leaving Certificate, he shall only be charged fees up to the end of the month in which he gives such notice.

### *Absence without Notice*

31. If a student is absent without notice for more than one month, his name may be struck off the books, in which case he shall be liable to pay fees for one month subsequent to that in which he last attended the lectures.

32. If a student who has been absent without notice for more than one month applies for a Leaving Certificate, the Principal may, at his discretion, grant such certificate, and may date the student's withdrawal from the day on which he last attended the lectures.

### *Expulsion and Rustication*

33. A Principal may for breach of College discipline—

- (1) suspend a student for one month or less ;
- (2) rusticate a student for any period exceeding one month and not exceeding the remainder of the academical year ; or
- (3) expel a student.

In the second and third cases the matter shall be reported by the Principal to the Syndicate, in the form of a brief statement including the date of rustication or expulsion.

34. If a student who has been so rusticated or expelled desires to continue his studies in some other College, he may apply to the Syndicate, who shall, after consideration of the circumstances, issue such orders as they may think proper: Provided that no order shall issue permitting such student to continue his studies in another College without a reference to the Principal of the College from which the student has been rusticated or expelled.

*Miscellaneous*

35. A student before being sent up to a University examination shall be required to pay all sums due to the College in which he has been reading including fees up to the end of the academical year.

36. Any instance of alleged "gross misconduct" on the part of a student when not followed by expulsion or rustication, must be at once notified by the Principal of the College to the Transfer Committee, together with a statement by the student. The Transfer Committee shall determine whether the case shall be recorded in the University Register of Students as one of "gross misconduct". Unless it is so recorded no future action taken on it by the Principal shall be recognised by the University.

37. Wilful transgression or colourable evasion of any of the foregoing rules shall be reported to the Syndicate.

38. All questions arising between one Principal and another respecting the interpretation of these rules, shall be referred as soon as possible to the Transfer Committee.

39. The academical year for the purpose of these Regulations shall be taken to commence on the 1st of June in one year and to end on the 31st of May in the next.

The Syndicate may alter these limits, if necessary.

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## CHAPTER XXIV

### RESIDENCE OF STUDENTS

1. Every student reading in an Affiliated College with the object of appearing at a University Examination who does not reside with his parents or other legal guardian, or guardian approved by the Principal of his College, shall reside either in his College or in lodgings approved by his College.

Act VII of 1904,  
Sec. 21 (c)

Any student making a false declaration in respect of the guardianship under which he is living shall be punished by the Principal of his College, who will deal with the offence as occasion requires.

2. A student shall be held to be residing in a College, if he resides in a Collegiate Hostel as defined under Regulation 7.

3. The following classes of lodging may be approved by a College :—

(a) Non-Collegiate Hostels, that is, hostels under external management.

(b) Messes attached or unattached.

(c) Private lodgings.

4. At the Annual Meeting of the Senate a Committee of six Fellows, not less than three of whom must be Indians, shall be appointed to deal in accordance with these Regulations with questions relating to the residence of students in non-collegiate hostels, messes and private lodgings.

5. This Committee shall be called the Students' Residence Committee. The proceedings of the Committee shall be submitted every month to the Syndicate for confirmation, and the Syndicate may approve, revise or modify the decision of the Committee on any matter, or direct the Committee to review it.

Four members shall form a quorum.

In the event of a vacancy occurring in the course of the year it shall be at once filled up by the Syndicate.

6. Nothing in these Regulations shall be taken to authorise the Students' Residence Committee or any member thereof to interfere with the internal management of a hostel or mess, or with the control of a Principal over his students. But if the Committee is satisfied, upon the report of one or more of its

members, or of an Inspector, that a hostel or mess is maintained or conducted in a manner contravening these Regulations, the Committee shall report the matter to the Syndicate.

### *Collegiate Hostels*

7. A Collegiate Hostel is a Boarding House for students which is under the direct and exclusive control of one College, which is regarded as an integral part of that College, and which admits only those students who are reading in that particular College.

8. The management of a Collegiate Hostel shall be entirely in the hands of the Governing Body of the College to which it belongs. There shall be in every such Hostel a Resident Superintendent, and if necessary, one or more Assistant Superintendents.

9. The Principal of the College concerned shall frame rules for his Collegiate Hostel, but in the case of every such hostel, the following practices shall be observed :—

- (a) Only male servants shall be employed.
- (b) A roll shall be called both morning and evening.
- (c) Without the special permission of the Superintendent, which shall be recorded in a book kept for the purpose, no student shall absent himself from the Hostel between 9 P.M. and 6 A.M.
- (d) The Superintendent shall keep a Gate Book in which he shall enter the name of any student who returns to the Hostel between the above hours ; he shall also enter his remarks against each case.

10. Every Collegiate Hostel shall be inspected once a year by the Inspector of Colleges.

11. Students shall have no right of appeal to the Syndicate against the orders of the Governing Body upon questions of internal discipline.

A student cannot be expelled from a Collegiate Hostel without being also expelled from the College to which it belongs, but he may be transferred to other lodgings under the control of the Principal.

### *Non-Collegiate Hostels*

12. A Non-Collegiate Hostel is a Boarding House for students, under external management. A Non-Collegiate Hostel shall not be recognised unless the individual or individuals responsible for the finances of such Hostel can give reasonable

guarantee for its continued maintenance. Such Hostels may admit only the following classes of boarders :—

- (1) Students of any affiliated College ;
- (2) Tutors of such students ;
- (3) School boys reading in recognised schools who are nearly related to students residing in such Hostels, and whose parents or guardians desire them to live with or under the direct supervision of such students.

Boarders belonging to classes (2) and (3) shall not be admitted without the sanction of the Students' Residence Committee.

13. Every Non-Collegiate Hostel shall be (a) under the supervision of a Manager and (b) under the general control of a Visiting Committee, both approved by the Students' Residence Committee. The Visiting Committee shall be composed of three persons, of whom at least two shall be representatives of the College or Colleges concerned.

14. All Non-Collegiate Hostels shall be open to inspection by the Students' Residence Committee and by any duly appointed University Inspector. Every such Hostel shall keep an Inspection Book in which the inspecting authorities may enter remarks.

15. There shall be in every such Hostel a properly qualified Resident Superintendent, and, if necessary, one or more Assistant Superintendents.

16. The conditions laid down under Regulation 9, clauses (a), (b), (c) and (d) shall also be enforced as regards all boarders in the case of Non-Collegiate Hostels ; and in addition thereto the Superintendent shall keep a Register of the Boarders containing the names and home addresses of the Boarders and of their parents or other guardians. The Register shall contain a column for remarks.

17. Every Non-Collegiate Hostel shall have written or printed rules, and such rules shall not contravene any of the foregoing conditions.

### *Messes*

18. A mess is a temporary Boarding House formed by a combination of students who desire to share expenses.

A mess has not necessarily any fixity of location for a period longer than one academical year, nor does the responsibility for its finances rest with the College or Colleges to which its members belong. Students not otherwise provided for by these Regulations shall live in messes provided or approved by the College authorities.

19. In the case of messes for which the University or any other public body provides the funds in part or in whole, each mess shall be attached to one College, and the students living in that mess shall be all students of one and the same College, and the Principal of that College shall have full control over that mess. Such messes shall be called attached messes.

The College to which a mess is attached shall appoint a Visiting Committee in consultation with the public body which provide funds for the mess and subject to the approval of the Students' Residence Committee.

20. Regulations 14 to 17 shall apply equally to attached messes.

21. Messes which receive no subvention from public bodies shall be known as unattached messes, and to them shall apply Regulations 12, 14, 15, 16 and 17.

There shall also be a Visiting Committee for unattached messes, consisting of three persons approved by the Students' Residence Committee, two of whom at least shall be representatives of the College or Colleges concerned.

### *Recognition and License*

22. Every Collegiate Hostel must obtain a Certificate of recognition from the University.

All other hostels and all messes must obtain annually within such time as the Syndicate may determine, a License from the University.

All applications for recognition of Collegiate Hostels shall be submitted by the Governing Body of the College concerned, and shall be dealt with by the Syndicate. Applications for License shall be dealt with by the Students' Residence Committee, and submitted in the case of (a) Non-Collegiate Hostels, by the Proprietor, (b) Attached messes, by the Principal of the College concerned, and (c) Unattached messes, by the College or Colleges concerned.

23. In dealing with applications for Recognition or License, the Syndicate or the Students' Residence Committee, as the case may be, shall have regard to the following points:—

- (a) Suitability of the buildings.
- (b) Adequacy of the accommodation.
- (c) Suitability of the neighbourhood.
- (d) Sanitary conditions.

24. The Senate may from time to time make rules not inconsistent with these Regulations relating to messes and Non-collegiate Hostels.

*Private Lodgings*

25. Upon the recommendation of the Principal of his College, a student may be permitted to live in his own residence or hired lodgings, provided that (1) if he is under 18 years of age he shall be accompanied by a tutor approved by his parents or other guardian, and (2) in any case the Students' Residence Committee is satisfied that he can be permitted so to live without detriment to his health, studies or character.

*Miscellaneous*

26. The Students' Residence Committee shall have power to delegate its functions in respect of Muffasil Centres to Local Committees, which shall submit all their proceedings to the Students' Residence Committee, for submission to and confirmation by the Syndicate.

27. The Syndicate may, upon the recommendation of the Students' Residence Committee sanction the admission of the following classes of boarders in Non-Collegiate Hostels :—

(a) University students.

(b) School boys attending a recognised School attached to an affiliated College, though such students are not related to any College student residing in the Hostel, provided that the controlling authority of the Hostel gives adequate guarantee for the maintenance of discipline.

28. The Syndicate may, in special and exceptional cases on the recommendation of the Principal controlling an Attached mess and of the Students' Residence Committee, permit one or more students of any other affiliated College or a student of any recognised School, who is nearly related to a member of the mess, to reside in such mess.

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## CHAPTER XXV

### EXAMINATIONS

#### *Setting of Papers*

1. No question shall be asked at any University examination which would require an expression of religious belief on the part of the candidates ; and any answer or translation given by any candidate shall not be objected to on the ground of its expressing peculiarities of religious belief.

2. Candidates shall give their answers in their own words as far as practicable in all subjects. This rule shall be inserted as a head note in every question paper.

3. Examiners setting papers shall be guided, as to the scope of the subject of examination, by the syllabus prescribed in the Regulations, and as to the standard and extent of knowledge required, by the books, if any, recommended from time to time for such purpose.

4. No copy of any examination paper is to be retained by the person setting it.

5. The papers set should be such as candidates can reasonably be expected to answer within the time allotted. The questions in each subject should be fairly distributed over the whole course in that subject, and should conform to the Regulations laid down for the particular examination ; there should not be any marked change of standard from year to year, but it is not required that the same type of questions should be set every year. Examiners shall always allow some choice of questions.

6. Questions should be so framed as to encourage good methods of work and teaching, and to discourage unintelligent memorizing.

#### *Awarding of Marks*

7. In the case of examinations in all Faculties up to and including the examination for the Bachelor's Degree, the Registrar shall, as soon as the results have been tabulated, prepare a list of the candidates who have failed in one subject only ; in order to guard against any possible inaccuracy, their papers in the subject in which they have failed shall be re-examined *on the method of marking already adopted and without any alteration of the standard.*

8. Examiners, in giving marks, shall take the correctness of the language of the answer into account.



9. Examiners, in giving marks, shall consider whether the answers indicate an intelligent appreciation of the subject or are merely the result of unintelligent memory work.

### *Meetings of Examiners*

10. As soon as possible after an examination has been held the persons who have set any question paper in the examination, the Moderators and those who are to examine the answers to that paper or any portion of it and the Head Examiner, if there is one, shall meet to determine the kind or standard of answers to be expected from candidates, and to decide upon a system of marking. Their conclusions shall be embodied in the memorandum to be jointly signed by them and forwarded to the Registrar. If owing to unavoidable circumstances any Examiner who has set a paper or a Moderator who has moderated a paper is unable to attend the meeting, the remaining Examiners contemplated by these Regulations shall meet and transact the aforesaid business.

11. In the case of any examination for the degree of Master or Doctor in the Faculties of Arts and Science, for the degree of Bachelor of Commerce and in the case of every examination in the other Faculties, the entire body of Examiners for that examination shall meet, as soon as possible after the tabulation of the results, and draw up a report of the examination as a whole for the consideration of the Syndicate.

As soon as possible after the publication of the results of every examination in every Faculty referred to in the preceding paragraph, the persons who have examined the answer-papers in each subject shall meet together and draw up a report upon the examination in that subject for the consideration of the Syndicate.

12. The reports submitted to the Syndicate shall ordinarily embody such remarks and recommendations suggested by the work done by the candidates which it is thought desirable in the interests of education to communicate to the Heads of Colleges and Schools.

### *Miscellaneous*

\*13. English shall be the medium of examination in all subjects except where otherwise specifically indicated.

\* Candidates for the I.A., I.Sc., B.A. Pass, B.Sc. Pass, B.Com., L.T. and B.T. Examinations are given the *option* of writing their answers only in Bengali. English technical terms may, however, be used. The option will not be allowed in the case of answer-papers in English (the answers in which must be written in English), and also in cases where there may be specific instructions in the question-paper as to the language in which the answer is to be written.

If a candidate chooses to answer any paper in Bengali he must write the whole paper in Bengali. He may, however, answer one paper in Bengali and another in English in the same subject.

14. Members of the Syndicate or of the Boards of Studies shall not be debarred from acting as Examiners.

15. Canvassing for examinerships will not be countenanced by the University ; and if it is proved to the satisfaction of the Syndicate that canvassing has been carried on by any person applying for an examinership, the candidate shall be disqualified.

16. Examiners are required to keep the results of the examinations and the marks assigned to candidates strictly secret.

17. If it is proved to the satisfaction of the Syndicate that the questions in any subject are not such as candidates could reasonably be expected to answer within the time allotted, or have not been fairly distributed over the whole course in that subject, or do not conform to the Regulations laid down for the examination in that subject, or show a marked change of standard, or that from any other cause injustice has been or is likely to be done, the Syndicate shall issue such directions as may be necessary to rectify matters.

18. No candidate shall ordinarily be declared to have passed or to have obtained Honours unless he has attained the standard laid down in the Regulations for a Pass or for Honours. If, however, the Syndicate are satisfied that consideration ought to be allowed in the case of any candidate by reason of his high marks in a particular subject or in the aggregate, the Syndicate may pass such candidate or award him Honours as the case may be :

Provided that no action shall be taken by the Syndicate in this behalf, except—

- (a) upon the Report of the Examination Board concerned in the case of the Matriculation Examination, the Intermediate Examination in Arts or Science, and the B.A., B.Sc. and B.Sc. (Tech.) Examinations, or
- (b) upon the Report of the Examiners in the case of any other Examination.

19. The results of the Matriculation Examination shall be considered annually by the Syndicate with a view to ascertaining the broad lines along which improvement in teaching is necessary and practicable, and the conclusions arrived at shall be communicated to the schools with suggestions as to action. Particular attention should be paid in this connection to the question of the introduction of new and improved methods of teaching English and Science and such of the suggestions either in regard to this question or any other which may arise from a survey of the results, as may be placed before the Syndicate by the agency entrusted with this work and are approved by the

Syndicate, shall be communicated to the schools by means of circulars for necessary action.

## ARTS, SCIENCE AND TECHNOLOGY EXAMINATIONS

### *Appointment of Examiners*

1. The Registrar shall, at such times as the Syndicate may determine, send to all Fellows on the Faculties of Arts and Science and to all Heads of Colleges affiliated in Arts and Science who are not Fellows, a circular requesting them to forward within one month the names of persons whom they consider suitable for appointment as Examiners for the University Examinations specified by the Syndicate.

Every such recommendation shall be accompanied by a brief statement of the special qualifications of their nominees.

2. Such recommendations and any applications from candidates for examinerships received by the Registrar shall, in the first instance, be referred to the Boards of Studies concerned who shall be asked to nominate for appointment as Examiners a number of persons not less than that required for each examination as indicated by the Syndicate, and not more than half in excess of that number.

The Examiners shall be appointed by the Syndicate after considering the names proposed by the Boards of Studies. In subjects for which there are no Boards of Studies, Examiners shall be appointed directly by the Syndicate.

3. A Board of Examiners consisting of two or more persons shall be appointed by the Syndicate, whenever practicable, to set papers in each subject in each examination of the University except for the Matriculation, I.A., I.Sc., B.A., B.Sc. and B.Sc. (Tech.) Examinations. Each paper shall, whenever practicable, be set by two Members of the Board in consultation. In the case of a difference of opinion arising between two Examiners, the point shall be referred to the other Member or Members of the Board, if any, otherwise it shall be referred to the Syndicate. For the Matriculation, I.A., I.Sc., B.A., B.Sc. and B.Sc. (Tech.) Examinations, each paper shall be set by one paper-setter only.

4. The Syndicate shall, whenever it may consider it desirable, appoint Head Examiners in different subjects in the case of examinations for which Head Examiners are required. In other cases, as far as practicable, the Members of the Board who set the papers shall be among those who look over the answer-papers.

5. For the Matriculation, the Intermediate in Arts and Science, and the B.A., B.Sc. and the B.Sc. (Tech.) Examinations,

no one shall be appointed to set a paper in a subject of which he teaches the whole or a part for the corresponding examination.

6. The Board of Examiners in each subject for the degree of Master in the Faculties of Arts, Science and Technology shall be composed of—

- (a) the University lecturers in that subject, and
- (b) one or more other Examiners appointed by the Syndicate. Such Examiners shall not be persons lecturing to or preparing candidates for the examination in the subject for which the Board is constituted.

7. Each Board appointed under the preceding Regulation shall meet as soon as possible after appointment for the purpose of apportionment of the examination papers in the subject for which it has been constituted. The appointment as far as the University Lecturers are concerned, shall ordinarily be proportionate to the course covered by their respective lectures. The distribution of papers shall be kept strictly secret.

### *Moderators*

#### *B.A. and B.Sc. Examinations*

8. (i) Each paper shall be set by one paper-setter.

(ii) The Syndicate shall appoint a Moderator in each subject, wherever possible; he shall moderate each question paper in consultation with the paper-setter concerned. It shall be the duty of the Moderator to see that the rules and regulations are strictly complied with.

In special cases the Syndicate may appoint more than one Moderator in a particular subject.

(iii) Each paper is to be signed by the paper-setter and the Moderator.

(iv) The Moderator shall allot the question papers among the different paper-setters, subject to final confirmation by the Vice-Chancellor.

(v) A Committee shall be appointed by the Syndicate for each major subject. This Committee shall be called the Results Committee for the subject concerned. Its duty shall be to consider the results in the subject and modify them, if necessary; such modifications will always be in accordance with the principles contained in the University Regulations or laid down by the Syndicate.

It will always be open to the Examiners in an Honours subject to meet and consider the results in the Honours subject concerned, and submit any report to the Results Committee for its consideration.

Each Results Committee shall consist of the following members :—

- (a) Chairman appointed by the Syndicate.
- (b) Two members selected by the Syndicate from among the Examiners in the subject.

In a subject in which there are Honours candidates, one of these two shall be an Honours Examiner and the other a Pass Examiner.

- (c) The Moderator or Moderators concerned.

If any Moderator is not available, a paper-setter shall be selected by the Syndicate.

- (d) One expert appointed by the Syndicate.

(vi) There shall be one Examination Board for the B.A., B.Sc. and B.Sc. (Tech.) Examinations consisting of—

- (a) The Vice-Chancellor, *Chairman*.
- (b) Dean of the Faculty of Arts.
- (c) Dean of the Faculty of Science.
- (d) Chairman of the Results Committees.
- (e) Five members appointed by the Syndicate, of whom two shall be selected from amongst the Members of the Syndicate, one shall belong to the Post-Graduate Department in Arts, one to the Post-Graduate Department in Science, and one to an affiliated College.

The functions of the Examination Board shall be—

- (a) To consider the reports of the Results Committees and co-ordinate them.
- (b) To modify such results, if necessary, in accordance with the principles contained in the Regulations or laid down by the Syndicate.
- (c) To consider all cases of breaches of discipline arising in connection with the examination.
- (d) To forward the results to the Syndicate for publication.

The statement made to the Syndicate shall contain confidential information on the change made by the Examination Board and the reasons for the change.

(vii) The Proceedings of the Board shall be subject to confirmation by the Syndicate. The Syndicate shall not have the power to modify the results but may refer them back to the Board for reconsideration.

#### *B.Sc. (Technology) Examination*

8A. (i) Each paper shall be set by one paper-setter.

(ii) The Syndicate shall appoint a Moderator in each subject, wherever possible; he shall moderate each question paper in consultation with the paper-setter concerned. It shall be the

duty of the Moderator to see that the rules and regulations are strictly complied with.

In special cases the Syndicate may appoint more than one Moderator in a particular subject.

(iii) Each paper is to be signed by the paper-setter and the Moderator.

(iv) The Moderator shall allot the question papers among the different paper-setters, subject to final confirmation by the Vice-Chancellor.

(v) A Committee shall be appointed by the Syndicate for each major subject. This Committee shall be called the Results Committee for the subject concerned. Its duty shall be to consider the results in the subject and modify them, if necessary, such modifications will always be in accordance with the principles contained in the University Regulations or laid down by the Syndicate.

Each Results Committee shall consist of the following members :—

(a) Chairman appointed by the Syndicate.

(b) Two members selected by the Syndicate from amongst the examiners in the subject.

(c) The Moderator or Moderators concerned.

If any Moderator is not available, a paper-setter shall be selected by the Syndicate.

(d) One expert appointed by the Syndicate.

(vi) There shall be one Examination Board for B.Sc. (Tech.) Examination consisting of—

(a) The Vice-Chancellor, *Chairman*.

(b) Dean of the Faculty of Technology.

(c) Chairman of the Results Committee.

(d) Four members appointed by the Syndicate, of whom two shall be selected from amongst the Members of the Syndicate, one shall belong to the Post-Graduate Department in Technology and one to an affiliated college.

The functions of the Examination Board shall be—

(a) To consider the reports of the Results Committees and co-ordinate them.

(b) To modify such results, if necessary, in accordance with the principles contained in the Regulations or laid down by the Syndicate.

(c) To consider all cases of breaches of discipline arising in connection with the examination.

(d) To forward the results to the Syndicate for publication.

The statement made to the Syndicate shall contain confidential information on the change made by the Examination Board and the reasons for the change.

(vii) The Proceedings of the Board shall be subject to confirmation by the Syndicate. The Syndicate shall not have

the power to modify the results but may refer them back to the Board for reconsideration.

### *I.A. and I.Sc. Examinations*

9. (i) Each paper shall be set by one paper-setter.

(ii) The Syndicate shall appoint a Moderator in each subject wherever possible; he shall moderate each question paper in consultation with the paper-setter concerned. It shall be the duty of the Moderator to see that the rules and regulations are strictly complied with.

In special cases the Syndicate may appoint more than one Moderator in a particular subject.

(iii) Each paper is to be signed by the paper-setter and the Moderator.

(iv) The Moderator shall allot the question papers among the different paper-setters, subject to final confirmation by the Vice-Chancellor.

(v) There shall be one Examination Board for the I.A. and I.Sc. Examinations consisting of—

(a) The Vice-Chancellor, *Chairman*.

(b) The Head Examiners in the various subjects.

(c) Four members appointed by the Syndicate of whom two at least shall be members of the Syndicate. Of these four, two shall belong to the Faculty of Arts and two to the Faculty of Science.

The functions of the Examination Board shall be—

(a) To consider the results and modify them, if necessary, in accordance with the principles contained in the University Regulations or laid down by the Syndicate.

(b) To consider all cases of breaches of discipline arising out of the examinations.

(c) To forward the results to the Syndicate for publication.

The statement made to the Syndicate shall contain confidential information on the change made by the Examination Board and the reasons for the change.

(vi) The Proceedings of the Board shall be subject to confirmation by the Syndicate. The Syndicate shall not have the power to modify the results but may refer them back to the Board for reconsideration.

### *Matriculation Examination*

10. (i) Each paper shall be set by one paper-setter.

(ii) The Syndicate shall appoint a Moderator in each subject wherever possible; he shall moderate each question paper in consultation with the paper-setter concerned. It shall be the duty of the Moderator to see that the rules and regulations are strictly complied with.

In special cases the Syndicate may appoint more than one Moderator in a particular subject.

(iii) Each paper is to be signed by the paper-setter and the Moderator.

(iv) The Moderator shall allot the question papers among the different paper-setters, subject to final confirmation by the Vice-Chancellor.

(v) There shall be one Examination Board for the Matriculation Examination consisting of—

(a) The Vice-Chancellor, *Chairman*.

(b) The Head Examiners in the various subjects.

(c) Four members appointed by the Syndicate, of whom two at least shall be members of the Syndicate. Of these four, two shall belong to the Faculty of Arts and two to the Faculty of Science.

The functions of the Examination Board shall be—

(a) To consider the results and modify them, if necessary, in accordance with the principles contained in the University Regulations or laid down by the Syndicate.

(b) To consider all cases of breaches of discipline arising out of the Examinations.

(c) To forward the results to the Syndicate for publication.

The statement made to the Syndicate shall contain confidential information on the change made by the Examination Board and the reasons for the change.

(vi) The Proceedings of the Board shall be subject to confirmation by the Syndicate. The Syndicate shall not have the power to modify the results but may refer them back to the Board for reconsideration.

## LAW EXAMINATIONS

### *Appointment of Examiners*

1. The Registrar shall, at such times as the Syndicate may determine, send to all Fellows on the Faculty of Law and to all Heads of Colleges affiliated in Law who are not Fellows, a circular requesting them to forward within one month the names of persons whom they consider suitable for appointment as Examiners for the Preliminary, Intermediate and Final B.L. Examinations.

Every such recommendation shall be accompanied by a brief statement of the special qualifications of their nominees.

2. Such recommendations and any applications from candidates for examinerships received by the Registrar shall, in the first instance, be referred to the Board of Studies in Law, who shall be asked to nominate for appointment as Examiners a number of persons not less than that required for each examination as indicated by the Syndicate, and not more than half in excess



of that number. In appointing Examiners, the Syndicate shall consider the recommendations and applications together with the reports of the Board of Studies thereon, but its selection shall not be limited by them. The Dean of the Faculty of Law for the time being shall be *ex-officio* President of the Examiners thus appointed.

3. A Board of Examiners consisting of three or more persons shall be appointed by the Syndicate, whenever practicable, to set papers in each examination. The Dean of the Faculty of Law for the time being shall be *ex-officio* President of each Board. Each paper shall, whenever practicable, be set by two Members of the Board in consultation. In the case of a difference of opinion arising between two Examiners, the point shall be referred to the President. The papers set shall be moderated by him in consultation with the other Members of the Board.

4. As far as practicable, the Members of the Board who set the paper shall be among those who look over the answer papers.

For the Preliminary, Intermediate and Final B.L. Examinations, no one shall be appointed Member of a Board of Examiners to set a paper in a subject of which he teaches the whole or a part for the corresponding examination.

#### MEDICAL EXAMINATIONS

##### *Appointment of Examiners*

1. The Registrar shall, at such times as the Syndicate may determine, send to all Fellows on the Faculty of Medicine and to all Heads of Colleges affiliated in Medicine who are not Fellows, a circular requesting them to forward within one month the names of persons whom they consider suitable for appointment as Examiners for the University Examinations specified by the Syndicate.

Every such recommendation shall be accompanied by a brief statement of the special qualifications of their nominees.

2. Such recommendations and any applications from candidates for examinerships received by the Registrar shall, in the first instance, be referred to the Board of Studies in Medicine who shall be asked to nominate a number of persons not less than that required for each examination as indicated by the Syndicate, and not more than half in excess of that number. In appointing Examiners the Syndicate shall consider the recommendations and applications, together with the reports of the Board of Studies thereon, but its selection shall not be limited by them. The Dean of the Faculty of Medicine for the time being shall be *ex-officio* President of the examiners thus appointed.

3. A Board of Examiners consisting of two or more persons shall be appointed by the Syndicate, whenever practicable, to

set papers in each subject in each examination. The Dean of the Faculty of Medicine for the time being shall be *ex-officio* President of each Board. Each paper shall, whenever practicable, be set by all the Members of the Board in consultation. In the case of a difference of opinion arising between two Examiners, the point shall be referred to the President. The papers set shall be moderated by him in consultation with the other Members of the Board.

4. As far as practicable, the Members of the Board who set the papers shall be among those who look over the answer papers.

5. Of the persons appointed to set papers in any subject for any examination, one at least must be a Teacher or Professor in that subject, and one at least, whenever available, shall be a person not teaching that subject for that examination.

6. Every oral, practical and clinical examination shall be conducted by two Examiners jointly.

#### ENGINEERING EXAMINATIONS

##### *Appointment of Examiners*

1. The Registrar shall, at such times as the Syndicate may determine, send to all Fellows on the Faculty of Engineering and to all Heads of Colleges affiliated in Engineering who are not Fellows, a circular requesting them to forward within one month the names of persons whom they consider suitable for appointment as Examiners for the University Examinations specified by the Syndicate.

Every such recommendation shall be accompanied by a brief statement of the special qualifications of their nominees.

2. Such recommendations and any applications received by the Registrar shall, in the first instance, be referred to the Board of Studies in Engineering, who shall be asked to nominate a number of persons not less than that required for each examination as indicated by the Syndicate, and not more than half in excess of that number. In appointing Examiners, the Syndicate shall consider the recommendations and applications together with the reports of the Board thereon, but their selection shall not be limited by them. The Dean of the Faculty of Engineering for the time being shall be *ex-officio* President of the Examiners so appointed.

3. A Board of Examiners consisting of two or more persons shall be appointed by the Syndicate, whenever practicable, to set papers in each subject in each examination. The Dean of the Faculty of Engineering for the time being shall be *ex-officio* President of each Board. Each paper shall, whenever practicable, be set by two Members of the Board in consultation. In the case of a difference of opinion arising

between two Examiners, the point shall be referred to the President. The papers set shall be moderated by him in consultation with the other Members of the Board.

4. As far as practicable, the Members of the Board who set the papers shall be among those who look over the answer papers.

5. Of the persons appointed to set papers in any subject for any examination, one at least must be a lecturer on that subject, and one at least shall be a person not teaching that subject for that examination.

### *Certificate in Tanning*

1. The Registrar shall, at such times as may be determined by the Syndicate, send to the members of the Board of Higher Studies in Applied Chemistry and to all Heads of Institutions affiliated in Tanning a circular, requesting them to forward within one month the names of persons whom they consider suitable for appointment as Examiners for the Examination for Certificate in Tanning.

Every such recommendation shall be accompanied by a brief statement of the special qualifications of their nominees.

2. Such recommendations and any applications received by the Registrar shall in the first instance be referred to the Board of Higher Studies in Applied Chemistry who shall be asked to nominate a number of persons not less than that required for each examination as indicated by the Syndicate, and not more than half in excess of that number.

In appointing Examiners, the Syndicate shall consider the recommendations and applications together with the reports of the Board thereon, but their selection shall not be limited by them. The Syndicate shall also appoint a President of the Examiners so appointed.

3. A Board of Examiners consisting of two or more persons shall be appointed by the Syndicate, whenever practicable, to set papers in each subject in each examination. The Syndicate shall also appoint a President for each Board. Each paper shall, whenever practicable, be set by two Members of the Board in consultation. In the case of a difference of opinion arising between the two Examiners, the point shall be referred to the President. The papers set shall be moderated by him in consultation with the other Members of the Board.

4. As far as practicable, the Members of the Board who set the papers shall be among those who look over the answer papers.

5. Of the persons appointed to set papers in any subject for any examination one at least must be a lecturer on that

subject, and one at least shall be a person not teaching that subject for that examination.

*Refund of Fees*

Notwithstanding anything contained in the different chapters of these Regulations, if the admission of a candidate to any examination is cancelled, the Syndicate may refund the fee paid therefor or may appropriate it for use as fee for admission to any subsequent examination of the same standard.

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## CHAPTER XXVI

### CONDITIONS OF STUDY IN AFFILIATED COLLEGES

1. A College affiliated in any subject for any of the examinations mentioned in this section shall provide for the delivery of the minimum number of lectures specified hereinafter to students who take up that subject.

(i) Intermediate Examination in Arts or Science—

(a) 140 lectures in each subject, of which not less than 60 shall be delivered in the second year.

(b) 70 lectures in Vernacular, of which not less than 25 shall be delivered in the second year :

Provided that the Syndicate may grant exemptions from this rule in cases where the number of students of any College reading a particular Vernacular is so small as to make it difficult to arrange for the delivery of lectures in that Vernacular :

Provided also that in Assam Colleges it shall not be obligatory on the authorities of a College to arrange for lectures in any other Vernacular than that of the majority of the students attending the College.

(ii) B.A. or B.Sc. Examination—

(a) In the Pass Course in each subject—160 lectures, of which not less than 65 shall be delivered in the second year.

(b) In the Honours Course in each subject—80 lectures in addition to the lectures in the corresponding Pass Course, of which not less than 30 shall be delivered in the second year.

(c) 70 lectures in Vernacular, of which not less than 25 shall be delivered in the second year :

Provided that the Syndicate may grant exemptions from this rule in cases where the number of students of any College reading a particular Vernacular is so small as to make it difficult to arrange for the delivery of lectures in that Vernacular :

Provided also that in Assam Colleges it shall not be obligatory on the authorities of a College to arrange for lectures in any other Vernacular than that of the majority of the students attending the College.

(iii) B.Sc. (Tech.) Examination—

(a) In each theoretical paper in Part I—40 lectures.

(b) In each theoretical paper in Part II—25 lectures.

(iv) B.Com. Examination—

55 lectures in each subject of which not less than 20 shall be delivered in the second year.

(v) M.A., M.Sc. or M.Sc. (Tech.) Examination—180 lectures in each subject.

(vi) Licentiate in Teaching—

Principles of Education	..	30	lectures.
Methods of Teaching and School Administration		65	„
History of Education	..	50	„

(vii) Bachelor of Teaching—

(a) Principles of Education including Educational Psychology	..	60	„
(b) History of Education	..	30	„
(c) General Methods, School Organisation and School Hygiene	..	30	„
(d) Contents and Methods of Teaching School subjects—20 lectures in each of the three subjects	..	60	„

There shall be provision for laboratory work in Science and practical work in Geography.

(e) Additional subject .. 30 lectures.

(viii) Preliminary, Intermediate or Final Examination in Law—in each subject or group of subjects .. 32 lectures and 12 sittings of a Moot-Court.

In the M.B. Examinations the number of lectures, practical and clinical instructions shall be as prescribed in the syllabuses in Chapters XLIV and XLV.

In addition to the minimum number of lectures specified above every college shall hold the minimum number of tutorial classes to be prescribed by the Syndicate in the subjects for the Intermediate Examination in Arts or Science, or B.A., B.Sc. or B.Com. Examination in which the college is affiliated.

A tutorial class shall consist of not more than 25 students.

2. If a College fails for three consecutive years to deliver the minimum number of lectures or hold the minimum number of tutorial classes prescribed above in any subject, proceedings shall be taken under Section 24 of the Indian Universities Act to withdraw from it the privileges of affiliation in that subject.

The College shall furnish the University at the end of each session with a statement showing the total number of lectures delivered and the total number of tutorial classes held, subject by subject, during the session just closed and the two sessions immediately preceding.

3. Every lecture and every tutorial class shall cover a period of not less than 45 minutes inclusive of the time allowed by the College rules for the assembling of the students.

4. For the purpose of these Regulations a period of practical work or class exercises of not less than 45 minutes shall be considered to be equivalent to a tutorial class held.

5. Every candidate who desires to appear as a collegiate student at any one of the examinations mentioned in Section 1 shall be required to prosecute a regular course of study for the time specified in the Regulations in the subjects which he takes up for the examination in question.

6. No student shall be considered to have prosecuted a regular course of study in any subject for any examination unless he has attended at least 75 per cent. of the lectures delivered and at least 60 per cent. of the tutorial classes held in that subject in one or more affiliated Colleges.

7. No lecture shall be deemed to be a lecture within the meaning of these Regulations, unless it is delivered to a whole class or permanent section of a class and unless it is reckoned in calculating the percentage of attendance of all students of the class or section who have taken up the subject in which the lecture is delivered.

*Note.*—If any section of students or if all the students, of a class or a section of a class, refuse to attend it, the class shall nevertheless be deemed to have been held and a lecture delivered therein and the students concerned shall be marked absent.

8. If the College to which the student belongs, is not affiliated in a particular subject which he desires to take up for examination, he may be permitted, by mutual arrangement between the Principals of the Colleges concerned, to attend lectures and tutorial classes on that subject in another duly affiliated College.

9. The percentage of attendance of every student under Section 5 shall be calculated on the total number of lectures delivered and the total number of tutorial classes held in each subject from the commencement of the academical year. If a student is transferred from one College to another, the percentage of attendance in the first College shall be calculated on the total number of lectures delivered and the total number of tutorial classes held in each subject up to the date borne on the transfer certificate and in the second College on the lectures delivered and the total number of tutorial classes held after that date.

10. If a College fails to deliver the minimum number of lectures and to hold the minimum number of tutorial classes prescribed in any subject or subjects the College shall be liable

to be debarred from sending up candidates for admission\ the examination concerned without the sanction of the Syndic previously obtained.

In cases where a student, after study for the period prescribed by the Regulations, shall have failed to attend 75 per cent. of the lectures and 60 per cent. of tutorial classes in any subject or subjects during this course, he shall not be admitted to the examination as a collegiate student, unless (a) he attends lectures and tutorial classes in such subject or subjects for another academical year, and (b) his attendance in the subject or subjects in question for the period prescribed by the Regulations amounts to at least 75 per cent. of the lectures delivered and 60 per cent. of tutorial classes held in the College or Colleges in which he studies for the prescribed period :

Provided that the provisions of this section shall not be applicable in so far as the Preliminary, Intermediate and Final Examinations in Law are concerned.

11. The course of study in any subject for the M.A., M.Sc. or M.Sc. (Tech.) Examination under University Teachers shall normally consist of 180 lectures and a student will be considered to have prosecuted a regular course of study in the subject if he has attended 65 per cent. of the lectures delivered in it. If however in exceptional circumstances, the total number of University lectures delivered in any subject falls below 180, attendance at 65 per cent. of lectures actually delivered in it will be considered sufficient :

Provided that it shall be competent to the relevant Executive Committee of the Council of Post-Graduate Teaching on the recommendation of the Heads of Departments, to relax this percentage rule in special cases.

12. The students of affiliated Colleges or University students who may be in Military or Naval training will, for purposes of admission to their respective examinations, be deemed to have attended all lectures and practical work during such period in their respective classes in the subjects taken up by them provided they produce certificates of having been in such training from the officer under whom they were in training :

Provided also that in the case of students with Science subjects they produce certificates from their Principals or some other competent authority approved by the Syndicate, to the effect that they have taken satisfactory courses of practical work in those subjects :

Provided further that students of the University taking part in Inter-University Athletic contests shall be deemed to have attended lectures or practical classes up to a limit of a total of six days in one academical year, during their absence necessitated by these matches but that no compensation shall



be given to the students taking part merely in Trial matches or Inter-collegiate League matches.

13. Notwithstanding anything contained in the Regulations the Syndicate may give such orders as may be necessary relating to admission and withdrawal of students, residence of students, conditions of study and examinations, conditions to be fulfilled by affiliated colleges and recognised schools, or such other matters as may be deemed necessary for the purpose of control, supervision and conduct of examinations and admission thereto. This Regulation shall remain in force for the duration of the War and for such further period as the Senate may by Regulation decide.

14. Notwithstanding anything stated hereinbefore the Syndicate shall have power, during the first three years after the Regulations regarding tutorial classes come into force to relax them or to suspend their operation in respect of attendance at or the holding of such classes in any subject or subjects for such period or periods and for such College or Colleges as the Syndicate may decide.

## CHAPTER XXVII

### CONDITIONS TO BE FULFILLED BY COLLEGES AFFILIATED IN SCIENCE

#### GENERAL

Colleges affiliated in any Science subject except Geography must be provided with gas and a plentiful supply of water, and there must be adequate connexions for this with the portion of the building allotted to Science teaching. There must be a suitably fitted lecture theatre of the ordinary type, and the lecture table, which should not be less than 12 feet long, must be provided with gas and water fittings, and must also be adapted in other respects for lecture demonstrations in the various sciences for which it is intended to use the theatre. There should be an aperture in one of the walls by which a beam of solar light can be admitted for optical and projection work. One lecture theatre will ordinarily suffice, but if the number of subjects in which the College is affiliated is considerable, additional accommodation in this respect will be necessary. There shall be separate rooms for practical work in each of the subjects for which the College is affiliated, and in each such room there shall be a good black board and a small demonstration table. A sufficient quantity of apparatus, etc., must be provided both for practical and lecture work, and there must be ample cupboard room for the apparatus when not in use. Lists are given in Appendix B showing what may be considered the minimum requirements in each case. For all Colleges affiliated up to the M.A. or M.Sc. standard in Physics or Chemistry an electric installation is desirable and should certainly be provided wherever there is a town supply of electricity.

#### SPECIAL

##### I.—PHYSICS

(a) *Intermediate Standard*.—Not more than 20 students shall be placed under one teacher in the practical class at one time. If the number exceeds 20, an additional teacher or demonstrator will be required. The size of a room which it is intended shall accommodate the above number of students, shall not be less than 20 feet by 25 feet. If the number of students exceeds 20, the size of the room must be proportionately

increased. The working tables should be small, about 6 feet by 3 feet, and should be very strongly made of teak wood. One or two large sinks with water taps must be provided.

(b) *B.A. or B.Sc. Standard.*—There shall be one teacher to every 15 students in the practical class. The room used for the Intermediate course, having the dimensions given above, will suffice for the B.A. or B.Sc. students and for a class of fifteen, but it is necessary for the work in the present course that each working place on the tables should be supplied with gas. A small room for optical work is desirable, but if it not possible to provide this a portion of the laboratory, which in this case should be larger, may be screened off for the purpose. A small workshop should be attached to the laboratory.

(c) *M.A. or M.Sc. Standard.*—There shall be one teacher to every 10 students in the practical class. In addition to the general laboratory two other rooms will be necessary, one for optical and the other for electrical work. A larger workshop will be necessary than in the previous case, and it should be furnished with a good lathe. A permanent *mistri* should be employed.

## II.—CHEMISTRY

(a) *Intermediate Standard.*—Not more than 20 students shall be placed under one teacher in the practical class at one time. If the number exceeds 20, an additional teacher or demonstrator will be required. The size of a room which it is intended shall accommodate the above number of students, shall not be less than 20 feet by 30 feet, and if the number of students exceeds 20, it must be proportionately increased. The working benches must be provided with gas, one jet for each student. Those benches which occupy the centre of the room should, for the sake of economy of space, be of double width, so as to admit of students working on both sides, and the shelf for reagents may, in this case, run along the centre of the table. Water taps with the corresponding sinks, should be provided in the ratio of about one to four students but the sinks in the case of the tables of double width, may be replaced by a properly treated wooden trough running along the centre. Two or three fume closets are necessary : one will suffice, if the working tables are supplied with small draught hoods.

(b) *B.A. or B.Sc. Standard.*—There shall be one teacher to every 15 students in the practical class. The laboratory for the Intermediate course can be adapted for the use of the B.A. and B.Sc. students as well. A small and well-lighted balance room and a combustion room must be provided in addition.

(c) *M.A. or M.Sc. Standard.*—An Additional laboratory with rooms for special work shall be provided for the use of M.A. and M. Sc. students, not more than ent of whom shall be under the supervision of one teacher.

### III.—PHYSIOLOGY

(a) *Intermediate Standard.*—Not more than 24 students shall be placed under one teacher. The working benches shall be furnished with racks for chemical and microscopical reagents; and gas, water and sinks shall be supplied in the same way as in the chemical laboratory. The size of a room for 24 students shall be not less than 20 feet by 30 feet.

(b) *B.A. or B.Sc. Standard.*—Not more than 12 students shall be placed under one teacher. The room for the practical work of the Intermediate standard can with some light adaptation be also used for the present standard.

(c) *M.A. or M.Sc. Standard.*—For M.A. or M.Sc. classes at least two additional laboratories are necessary for special work.

### IV.—BOTANY

The number of students that may be placed under one teacher in the practical classes is the same as for Physiology and the conditions to be fulfilled with regard to the laboratories are substantially the same as in that subject.

### V.—ZOOLOGY

Not more than 20 students shall be placed under one teacher in the practical classes. Otherwise the requirements are the same as in the case of Physiology and Botany, except that the accommodation required for M.A. and M.Sc. students will not be so great as in those subjects.

### VI.—GEOLOGY

(a) *Intermediate Standard.*—Not more than 15 students shall be placed under one teacher in the practical class.

(b) *B.A. or B.Sc. Standard.*—Not more than 10 students shall be placed under one teacher in the practical class.

### VII.—GEOGRAPHY

There must be a small museum for practical teaching and demonstration, and a well-lighted room suitable for drawing and modelling, and fully furnished with the appliances necessary for the course of practical work prescribed by the Regulations.

## VIII.—PSYCHOLOGY

The laboratory must be furnished with plastic and other models and charts for anatomical and physiological demonstrations, in addition to the appliances necessary for psychophysical work, and must also be suitable for optical and electrical work.

## IX.—ANTHROPOLOGY

(a) *Intermediate Standard*.—Not more than 24 students shall be placed under one teacher at one time in the practical class. At least two working tables about 6 feet by 3 feet should be provided for in a room adequately suited for the purpose. There shall also be a small museum with the casts, specimens or photographs or slides as stated in the requirements for practical classes. The size of a room for 24 students shall not be less than 20 feet by 30 feet.

(b) *B.A. or B.Sc. Standard*.—Not more than 12 students shall be placed under one teacher. The room for the practical classes in the Intermediate standard may be used for the B.A. or B.Sc. classes provided it is fitted up with the additional requirements as specified in the list for practical appliances. It is also desirable to have a separate room of adequate dimensions for the collections of casts, specimens or photographs as specified.

## X.—STATISTICS

(a) *B.A. or B.Sc. Standard*.—There shall be one teacher to every 12 students in the practical class. The laboratory should be provided with necessary Mathematical and Statistical tables and charts and calculating machines.

(b) *M.A. or M.Sc. Standard*.—There shall be one teacher to every 8 students in the practical class.

## CHAPTER XXVIII

### UNIVERSITY LIBRARY

1. The Syndicate shall appoint annually two Committees, one to be called the Library General Committee and the other the Library Executive Committee.

The General Committee shall consist of the Vice-Chancellor—*Chairman*, the President, Council of Post-Graduate Teaching in Arts, the President, Council of Post-Graduate Teaching in Science, the Registrar, the Secretaries to the Councils of Post-Graduate Teaching in Arts and Science, and twelve other members of whom (a) six shall be members of the Senate, (b) six shall be the University teachers, three being appointed on the recommendation of the Executive Committee of the Council of Post-Graduate Teaching in Arts and three on the recommendation of the Executive Committee of the Council of Post-Graduate Teaching in Science.

The Executive Committee shall consist of the Vice-Chancellor—*Chairman*, the Registrar, the Secretaries to the Councils of Post-Graduate Teaching in Arts and Science and three members of the General Committee.

Members of the Committees shall hold office for one session.

In the event of a vacancy occurring in the course of the year it shall be filled up by the Syndicate.

2. The General Committee shall meet ordinarily once every six months, and, at other times, when convened by the Vice-Chancellor. Seven members shall form a quorum.

The Executive Committee shall meet ordinarily once a month, and, at other times, when convened by the Vice-Chancellor. Three members shall form a quorum.

3. The proceedings of the meetings of the Committees shall be recorded and regularly submitted to the Syndicate for confirmation. The Syndicate may approve, revise, or modify the decision of either Committee on any matter, or direct the Committee to review it.

4. The duties of the General Committee shall be—

(I) to recommend to the Syndicate rules regulating—

(a) the use of the Library by Fellows, by Registered Graduates, and by other persons,

- (b) the payment of fees for the use of the Library by persons other than Fellows,
  - (c) the conditions of borrowing and returning books,
  - (d) the suspension of privileges for the loss, mutilation, or disfigurement of books, or for any breach of the Library Rules,
  - (e) the annual inspection of the Library, and
  - (f) all other matters relating to the management of the Library ;
- (II) to recommend to the Executive Committee the purchase of books and manuscripts.

5. The duties of the Executive Committee shall be to give orders for the purchase, arrangement and cataloguing of the books and manuscripts, for the provision of book-cases and other fittings, for the cleaning of the Library, and for all ordinary repairs, and generally to supervise the management of the Library, and to do all that is in their opinion desirable for the maintenance of the Library in an efficient condition, so far as it is practicable to do so within the limits of the annual grant.

6. The General Committee shall prepare its annual Budget Estimates which shall be placed before the Post-Graduate Finance Committee in the first instance for scrutiny and shall then be laid before the University Finance Committee for necessary action.

7. The Syndicate shall make an annual report to the Senate concerning the state of the Library and all matters concerning the Library which in their opinion should be brought to the notice of the Senate. The report shall be accompanied by a statement of the expenditure of all moneys devoted to the purposes of the Library.

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## CHAPTER XXIX

### TRANSITORY REGULATIONS

1. In this chapter the phrase "new Regulations" shall be taken to mean the present body of Regulations.

The phrases "existing Bye-laws," "existing Regulations," and "existing Rules" shall be taken to refer respectively to the Bye-laws, Regulations and Rules in operation on the date previous to that on which the new Regulations come into force.

2. All questions relating to the alteration or cancellation of existing Bye-laws, Regulations and Rules shall be decided with reference to the provisions of this chapter.

3. The new Regulations shall come into force on the date of their publication in the *Gazette of India*; such date shall be called the date of commencement of the new Regulations.

4. Except as hereinafter provided, on and from the date on which the new Regulations come into force, all existing

(i) Bye-laws,

(ii) Regulations, and

(iii) Rules which are in any way inconsistent with the new Regulations,

shall cease to have operation.

5. As soon as practicable after the date of commencement of the new Regulations the Vice-Chancellor shall cause steps to be taken for the appointment of the Faculties, the Syndicate, the Boards of Studies, the Board of Accounts, the Library General Committee, the Library Executive Committee, the Transfer Committee, the Students' Residence Committee, the Registrar and the Inspector of Colleges. in accordance with the new Regulations :

Provided that any act which is required by the new Regulations to be done, at, before, or after an annual Meeting, may for this purpose be validly done, at, before, or after a Special Meeting.

6. As soon as each of the Faculties, the Syndicate, each of the Boards of Studies and the Board of Accounts is duly constituted under Regulation 5, the corresponding body provisionally constituted under Section 12.(g) of the Indian Universities Act, shall cease to exist :

Provided that each of these provisional bodies so long as it continues to exist, shall discharge its functions in accordance with the existing bye-laws, which shall be deemed to be in force for this purpose.



7. The Faculties, the Syndicate, the Boards of Studies, the Board of Accounts, the Library General Committee, the Transfer Committee, the Students' Residence Committee and the Library Executive Committee appointed under Regulation 5 shall continue to hold office till they are reconstituted in 1908, in accordance with the new Regulations.

8. The Registrar holding office at the commencement of the new Regulations shall continue to hold office till the Registrar appointed under Regulation 5 assumes charge. If, in the interval, there is a vacancy in the office of the Registrar, the Syndicate may appoint an Acting Registrar on such terms as may be found necessary. The Registrar appointed under Regulation 5 shall continue to hold office not later than the 31st of March, 1912.

9. The Inspector of Colleges appointed under Regulation 5 shall continue to hold office not later than the Annual Meeting of the Senate in 1912.

10. The Matriculation Examination shall be held for the first time in accordance with the new Regulations in 1910.

11. The Entrance Examination in 1907, 1908, and 1909 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

12. Any person who passes or has passed the Entrance Examination shall be deemed qualified for admission to any University Examination other than that mentioned in Section 42 in the same manner as if he had passed the Matriculation Examination in accordance with the new Regulations.

13. The Intermediate Examination in Arts shall be held for the first time in accordance with the new Regulations in 1909.

14. The First Examination in Arts in 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

15. Any person who passes or has passed the First Examination in Arts shall be deemed qualified for admission to any University Examination other than that mentioned in Regulation 42 in the same manner as if he had passed the Intermediate Examination in Arts or the Intermediate Examination in Science in accordance with the new Regulations. For the purpose of the Examination mentioned in Regulation 42 of this chapter, a student, who has passed the F.A. or the Intermediate in Arts, shall be deemed qualified in the same manner as a student who has matriculated in accordance with the new Regulations.

16. Any candidate who fails at the First Examination in Arts in 1908 or has failed in any previous year, or who was qualified to appear at any such examination but did not appear,

or who was not sent up to any such examination by reason of deficiency in attendance at lectures, or who was not permitted by the Principal of his College to appear, may be admitted to the Intermediate Examination in Arts or the Intermediate Examination in Science in 1909, provided he has prosecuted, in accordance with the new Regulations, a regular course of study for one academical year in the subjects he offers. Any candidate appearing at a subsequent examination shall strictly comply with the new Regulations.

17. The B.A. Examination shall be held for the first time in accordance with the new Regulations in 1909.

18. The B.A. Examination in 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

19. The M.A. Examination shall be held for the first time in accordance with the new Regulations in 1909.

20. The M.A. Examination in 1906, 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

21. Any Bachelor of Science who, in or before 1908, passes or has passed the M.A. Examination in Mathematics or in any branch of Natural or Physical Science, shall be entitled to the same privileges for the purpose of admission to University Examination as if he had passed the M.Sc. Examination in accordance with the new Regulations.

22. The Examination for the Degree of Doctor of Philosophy shall be held for the first time in accordance with the new Regulations in 1907.

23. The Intermediate Examination in Science shall be held for the first time in accordance with the new Regulations in 1909.

24. The B.Sc. Examination shall be held for the first time in accordance with the new Regulations in 1909.

25. The B.Sc. Examination in 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

26. The M.Sc. Examination shall be held for the first time in accordance with the new Regulations in 1909.

27. The Examination for the Degree of Doctor of Science shall be held for the first time in accordance with the new Regulations in 1908.

28. The Examination for the Degree of Doctor of Science in 1906 and 1907 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

29. The Preliminary Examination in Law shall be held for the first time in accordance with the new Regulations in 1908.

30. The Final Examination in Law shall be held for the first time in accordance with the new Regulations in 1909.

31. The B.L. Examination in 1906, 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

32. (i) Any candidate who fails at the B.L. Examination in 1908, or has failed in any previous year, or who was qualified to appear at any such examination but did not appear, may, in any year not later than 1912, appear at the Preliminary Examination in Law, and, if he passes, may appear at the Final Examination in Law in the same year or in any subsequent year not later than 1912.

(ii) Any candidate who is not or has not been sent up to the B.L. Examination of 1908 or of any previous year by reason of deficiency in attendance at lectures, shall be entitled to the same privileges as the candidates referred to in the preceding paragraph, provided he makes up his deficiency in accordance with the existing Regulations.

(iii) In any year subsequent to 1912 no person shall be admitted to either the Preliminary or the Final Examination in Law, except in strict conformity with the new Regulations.

33. The M.L. Examination shall be held for the first time in accordance with the new Regulations in 1907.

34. The Examination for Honours in Law in 1906 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force. Any candidate who may pass at such Examination shall be entitled to the same privileges as if he had passed the M.L. Examination in the first class under the new Regulations.

35. Up to 1907 the Degree of Doctor of Law shall be conferred in accordance with the existing Regulations, and in and after 1908 in accordance with the new Regulations.

36. The Preliminary Scientific L.M.S. Examination in accordance with the existing Regulations and Rules shall be held for the last time in 1907, and for this purpose those Regulations and Rules shall be deemed to be in force.

37. The First L.M.S. Examination in 1907, 1908 and 1909 (and in no subsequent year) shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

38. The Second L.M.S. Examination in 1907, 1908, 1909, 1910 and 1911 (and in no subsequent year) shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

39. Any candidate who fails in the Preliminary Scientific L.M.S. Examination in 1907 may appear at the Preliminary Scientific M.B. Examination in 1908 or 1909, provided he attends in an affiliated College a regular course of lectures for one academical year, in the subjects in which he has failed as also in the additional subjects in which he has not previously attended any lectures. If any such candidate attains the standard laid down in the new Regulations for the Preliminary Scientific M.B. Examination, he shall be declared to have passed that examination.

40. Any candidate who fails in the First L.M.S. Examination in 1909 may appear at the First M.B. Examination in 1910 or 1911, provided he attends in an affiliated College a regular course of lectures for one academical year, (i) in the subjects in which he has failed, (ii) in any additional subjects in which he has not previously attended any lectures, and (iii) in the subject of Zoology as prescribed for the Preliminary Scientific M.B. Examination under the new Regulations. If such candidate attains the standard laid down in the new Regulations for the First M.B. Examination and also passes an examination in Zoology in the standard of the Preliminary Scientific M.B. Examination, he shall be declared to have passed the First M.B. Examination.

41. Any candidate who fails in the Second L.M.S. Examination in 1911 may appear at the Second M.B. Examination in 1912 or 1913, provided he attends in an affiliated College a regular course of lectures for one academical year in the subjects in which he has failed. If such candidate attains the standard laid down in the new Regulations for the Second M.B. Examination (Parts I and II or Part II only, as the case may be), he shall be granted a certificate of having passed the Second L.M.S. Examination.

42. The Preliminary Scientific M.B. Examination shall be held for the first time in accordance with the new Regulations in 1908: Provided that at the Examinations held in 1909 and 1910 no one shall be admitted who has not passed the F.A. Examination or the Intermediate in Arts or the Intermediate in Science

43. The Preliminary Scientific M.B. Examination in 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

In 1908 there shall be two Examinations, one in accordance with the existing Regulations and the other in accordance with the new Regulations. For the latter no one shall be eligible who has not passed the F.A. Examination.

44. The First M.B. Examination shall be held for the first time in accordance with the new Regulations in 1910.

45. The First M.B. Examination in 1907, 1908 and 1909 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

46. The Final M.B. Examination shall be held for the first time in accordance with the new Regulations in 1913.

47. The Second M.B. Examination in 1907-1912 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

48. The Examinations for Honours in Medicine, for the Degrees of Doctor of Medicine, Master of Surgery and Master of Obstetrics, and for the Diploma in Public Health, shall be held for the first time in accordance with the new Regulations in 1907.

49. The Examination for the Degree of Doctor of Medicine in 1906 shall be held in accordance with the existing Regulations, which, for this purpose, shall be deemed to be in force.

50. The Intermediate Examination in Engineering shall be held for the first time in accordance with the new Regulations in 1909.

51. In 1907, 1908 and 1909 the First Examination in Engineering shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

52. In 1910 and 1911, the First Examination in Engineering shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force :

Provided, however, that at the examination in either of these years, only the following classes of candidates shall be allowed to appear :—

(a) Candidates who have failed at any previous F.E. Examination.

(b) Candidates who have not passed any examination higher than the Entrance or Matriculation Examination.

53. Any candidate who fails at the F.E. Examination in 1911 may be admitted to the Intermediate Examination in Engineering in 1912 or 1913.

54. Any person who passes or has passed the F.E. Examination shall be deemed qualified for admission to University Examinations in the same manner as if he had passed the Intermediate Examination in Engineering in accordance with the new Regulations.

55. The B.E. Examination shall be held for the first time in accordance with the new Regulations in 1911.

56. The B.E. Examination in 1907, 1908, 1909 and 1910 and the L.E. Examination in 1907-1912, shall be held in accordance with the existing Regulations and Rules, which for this purpose, shall be deemed to be in force.

57. The Examination for Honours in Engineering shall be held for the last time in 1907, in accordance with the existing Regulations, which for this purpose, shall be deemed to be in force.

58. Up to 1909 the Degree of Master in Engineering shall be conferred in accordance with the existing Regulations, which, for this purpose, shall be deemed to be in force.

59. The Degree of Doctor of Science (Engineering) may be conferred in 1907 in accordance with the new Regulations.

60. The Examination for Licentiate in Teaching and Bachelor of Teaching shall be held for the first time in 1908.

61. As soon as practicable after the commencement of the new Regulations, the Syndicate shall frame, subject to the approval of the Senate :—

(a) A revised body of Rules for the conduct of the examinations which, according to the preceding Regulations, have to be held in accordance with the existing Regulations ; and

(b) A body of Rules for the conduct of the examinations to be held in accordance with the new Regulations :

Provided that nothing in the Rules made under (a) shall contravene the existing Regulations, and nothing in the Rules made under (b) shall contravene the new Regulations.

62. Nothing in the Regulations contained in this chapter shall be deemed to prohibit any alteration in the existing Regulations and Rules, provided such alteration is made by the Body competent in that behalf, and in the manner prescribed by the new Regulations.

63. Within eight weeks from the date when these Regulations come into force the Principal of every affiliated College shall forward to the Registrar the name of every student on the rolls of the College, together with the Registration fee of Rs. 2 required for Matriculation by Regulation 6 of Chapter XV. The Registrar shall, upon receipt of the fee, enter the name of every such student on the Register of University Students.

64. In any case not covered by the preceding Regulations of this chapter, the Syndicate shall give such directions as may be justified by the special circumstances of the case.

## CHAPTER XXX

### MATRICULATION EXAMINATION

1. The Matriculation Examination shall be held annually in Calcutta and in such other places as shall, from time to time, be appointed by the Syndicate, the date to be duly notified.

2. (i) Ordinarily, only pupils who have been educated for at least one school year previous to the date of the Matriculation Examination at a school, recognised by the Calcutta University for such purpose, shall be admitted to the Matriculation Examination.

(ii) Candidates who have not attended any school for at least one year previous to the Examination, may also be admitted to the Examination as Private candidates, and the following procedure shall apply in their cases :—

(a) All such candidates shall submit their applications to the Divisional Inspector of Schools, on or before a date to be fixed by the Syndicate in this behalf; such candidates in submitting their applications to the Inspector of Schools, shall produce satisfactory evidence that they have prosecuted a regular course of study and have been subject to proper discipline.

§(b) In the cases of candidates who are able to produce evidence to his satisfaction that they have prosecuted a regular course of study and have been subject to proper discipline, the Inspector of Schools shall arrange for their appearance at the Test Examination of a recognised school or at a special Test Examination to be held by him for this purpose.

(c) The Inspector of Schools shall submit to the Registrar, in such forms as may, from time to time, be prescribed by the Syndicate in this behalf and on or before such dates as may be fixed by the Syndicate, lists of candidates—

- (1) who have been permitted by the Inspector to appear at the Test Examination under (b) above; and
- (2) who have not been granted permission to appear at the Test Examination, recording in each case the reason for the refusal of permission.

The Inspector of Schools shall inform the candidates concerned accordingly.

(iii) Private girl candidates need not appear at a Test Examination. But girl candidates will not be entitled to appear

as Private candidates if they have read in any recognised school one year previous to the Examination.

These provisions shall not take away the power of the Syndicate to deal with special cases in such way as it thinks proper.

3. The application of every candidate sent up for the Matriculation Examination must be accompanied by a certificate in one of the forms prescribed by the Syndicate.

4. The Head Masters of recognised schools shall submit to the Controller of Examinations within such date as may be prescribed by the Syndicate, the applications of those pupils and Private candidates who have passed the Test Examination together with the necessary fees prescribed in Regulation 5.

In cases of Private candidates where the Inspector of Schools has held a Test Examination, the applications of candidates who have passed the Examination shall similarly be forwarded, together with the necessary fees, by the Inspector of Schools.

The applications of Private girl candidates for admission to the Matriculation Examination will be submitted to the Controller of Examinations in the prescribed form with necessary fees within such date as may be prescribed by the Syndicate.

5. A fee of fifteen rupees shall be forwarded by each candidate with his application. A candidate, who fails to pass or to present himself for the Examination, shall not be entitled to claim a refund of the fee. He may be admitted to one or more subsequent Matriculation Examinations, subject to the conditions laid down in these Regulations.

Provided that if a candidate who has passed the Matriculation Examination and is prosecuting his studies for a higher examination in a College affiliated to this University, is required by the University to appear in a special subject at the Matriculation Examination, he shall pay a reduced fee of Rs. 8 only.

6. The Matriculation Examination shall be conducted by means of printed papers, the same papers being used at every place at which the Examination is held. All papers other than those on a Vernacular shall be set in the English language.

7. (1) The Matriculation Examination shall be a general test of fitness for admission to the University of Calcutta.

(2) Unless otherwise provided answer-papers in all subjects other than English and other European languages shall be written in one or other of the Major Vernaculars, viz., Bengali, Urdu, Assamese and Hindi:

Provided that—

(a) the Syndicate may in special cases or class of cases including schools and individuals make exceptions to this rule



or postpone its operation either in whole or in part for a prescribed time :

(b) candidates, whose Vernacular is a language other than a Major Vernacular, shall have the option of writing their answers in all papers other than the Vernacular paper, if any, either in English or in one of the Major Vernaculars and they shall state in their application form the language chosen ;

(c) whenever the Managing Committee or any other authority of a recognised school outside Bengal or in the District of Darjeeling or in the Chittagong Hill Tracts applies to the effect that the pupils of such a school should be exempted from the necessity of writing their answers in any of the Major Vernaculars recognised for the purpose by the University, the Syndicate shall exempt them for a specified period or periods from the operation of the general rule and permit them to give their answers in all subjects other than the Vernacular, if any, in English instead.

8. Candidates for the Matriculation Examination shall be examined in the following subjects :—

- |   |                                  |
|---|----------------------------------|
| (1) A Major Vernacular Language, viz.,  |                                  |
| Bengali, Urdu, Assamese or Hindi  | .. <i>Two papers.</i>            |
| (2) English   | .. <i>Two papers and a half.</i> |
| (3) Geography   | .. <i>Half paper.</i>            |
| (4) History of India and History of England   | <i>One paper.</i>                |
| (5) Mathematics   | .. <i>One paper.</i>             |
| (6) A Classical Language (viz., Sanskrit, Pali, Arabic, Persian, Greek, Latin, Classical Armenian, Hebrew, Syriac or Classical Tibetan) ; |                                  |

or

- \* An Alternative Vernacular recognised by the Syndicate, from time to time, other than the Major Vernacular of the candidate already taken up as a compulsory subject ;

or

A modern European Language other than English (viz., French, German, Italian or Portuguese)

*One paper.*

- (7) Elementary Scientific Knowledge .. *One paper.*

Provided that Elementary Scientific Knowledge shall not be regarded as a compulsory subject for three years from the

\* The following Alternative Vernaculars have been recognised by the Syndicate : Bengali, Hindi, Uriya, Assamese, Urdu, Khasi, Nepali, Telegu, Marathi, Gujarathi, Maithili, Tamil, Kanarese, Malayalam, Garo, Manipuri, Lushai, Modern Tibetan, Modern Armenian, Sindhi, Sinhalese, Santali and Panjabi (Gurumukhi).

year in which the first Matriculation Examination will be held under the new Regulations. During the period of transition Elementary Scientific Knowledge shall be included in the list of optional subjects stated below :

\* (8) Candidates who have taken up a Major Vernacular may, if they so desire, take up one of the following subjects :—

- (a) Elementary Scientific Knowledge, subject to the above proviso.
- (b) Elements of Physics and Chemistry.
- (c) Mensuration and Surveying.
- (d) Elementary Mechanics.
- (e) Elementary Hygiene.
- (f) Elements of Biology.
- (g) Additional Mathematics.
- (h) Business Method and Correspondence.
- (i) Commercial Geography.
- (j) Elements of Public Administration in India.
- (k) Drawing and Painting including an appreciation of Fine Arts.

(One paper each).

If the Vernacular of a candidate is a language other than a Major Vernacular he shall take up in lieu of the two papers on the Major Vernacular, two papers on any two subjects out of the following :—

- (a) A Classical Language, if not taken under 8 (6)

or

† An Additional Alternative Vernacular other than the Language, if any, taken as Alternative Vernacular under 8 (6).

- (b) Elementary Scientific Knowledge, subject to the proviso above.
- (c) Elements of Physics and Chemistry.
- (d) Mensuration and Surveying.
- (e) Elementary Mechanics.
- (f) Elementary Hygiene.

\* No school will be allowed to teach any subject involving lectures which should be experimentally illustrated or involving the pupils themselves doing practical experimental work unless the Syndicate is satisfied that adequate arrangements have been made for the purpose.

*Note.*—Candidates who take up Mathematics and Science subjects must be familiar with technical terms in the English language, which fall within the prescribed syllabus.

† The following Additional Alternative Vernaculars have been recognised by the Syndicate :—Bengali, Hindi, Uriya, Assamese, Urdu, Khasi, Nepali, Telegu, Marathi, Gujarathi, Maithili, Tamil, Kanarese, Malayalam, Garo, Manipuri, Lushai, Modern Tibetan, Modern Armenian, Sindhi, Sinhalese, Santali and Panjabi (Gurumukhi).

- (g) Elements of Biology.
- (h) Additional Mathematics.
- (i) Business Method and Correspondence.
- (j) Commercial Geography.
- (k) Elements of Public Administration in India.
- (l) Additional English.
- (m) Drawing and Painting including an appreciation of Fine Arts.

(One paper each).

He may, if he so desires, take up an additional third subject out of the subjects specified above.

9. Notwithstanding anything stated above girl candidates shall be examined in the following subjects :—

- (1) A Major Vernacular Language,
- (2) English,
- (3) Geography,
- (4) History of India and History of England,
- (5) Mathematics or

} as in Section 8.

Arithmetic and Domestic Science including Domestic Hygiene .. .. .

One paper.

- \* (6) At least one but not more than two until Elementary Scientific Knowledge is made compulsory for boys and thereafter at least two but not more than three of the following :—

- (a) One of the languages mentioned in sub-section (6) of Section 8.
- (b) Elementary Scientific Knowledge.
- (c) Elements of Physics and Chemistry.
- (d) Elementary Mechanics.
- (e) Elementary Hygiene.
- (f) Elements of Biology.
- (g) Additional Mathematics.
- (h) Business Method and Correspondence.
- (i) Commercial Geography.
- (j) Elements of Public Administration in India.
- (k) Sewing and Needlework.
- (l) Music.
- (m) Drawing and Painting including an appreciation of Fine Arts.

(One paper each).

\* No school will be allowed to teach any subject involving lectures which should be experimentally illustrated or involving the pupils themselves doing practical experimental work unless the Syndicate is satisfied that adequate arrangements have been made for the purpose.

If the Vernacular of a girl candidate is a language other than a Major Vernacular, she shall be examined in the following subjects :—

- |  |                    |
|--|--------------------|
| (1) English,                                 | } as in Section 8. |
| (2) Geography,                               |                    |
| (3) History of India and History of England, |                    |
| (4) Mathematics or                           |                    |
- Arithmetic and Domestic Science including Domestic Hygiene .. .. . *One paper.*
- (5) A Classical Language (*viz.*, Sanskrit, Pali, Arabic, Persian, Greek, Latin, Classical Armenian, Hebrew, Syriac or Classical Tibetan)

*or*

\*An Alternative Vernacular recognised by the Syndicate from time to time

*or*

A modern European Language other than English (*viz.*, French, German, Italian or Portuguese) *One paper.*

† (6) At least two but not more than three until Elementary Scientific Knowledge is made compulsory and thereafter at least three but not more than four of the following :—

- (a) A Classical Language, if not taken under 9 (5) *or*  
An Additional Alternative Vernacular other than the language, if any, taken under 9 (5).
- (b) Elementary Scientific Knowledge.
- (c) Elements of Physics and Chemistry.
- (d) Elementary Mechanics.
- (e) Elementary Hygiene.
- (f) Elements of Biology.
- (g) Additional Mathematics.
- (h) Business Method and Correspondence.
- (i) Commercial Geography.
- (j) Elements of Public Administration in India.
- (k) Additional English.

\* The following Alternative Vernaculars and Additional Alternative Vernaculars have been recognised by the Syndicate : Bengali, Hindi, Uriya, Assamese, Urdu, Khasi, Nepali, Telugu, Marathi, Gujarathi, Maithili, Tamil, Kanarese, Malayalam, Garo, Manipuri, Lushai, Modern Tibetan, Modern Armenian, Sindhi, Sinhalese, Santali and Panjabi (Gurumukhi).

† No school will be allowed to teach any subject involving lectures which should be experimentally illustrated or involving the pupils themselves doing practical experimental work unless the Syndicate is satisfied that adequate arrangements have been made for the purpose.

- (l) Sewing and Needlework.
- (m) Music.
- (n) Drawing and Painting including an appreciation of Fine Arts.

(One paper each).

No girl candidate shall be allowed to take up Mathematics or Physics or Chemistry as a subject for the Intermediate Examination unless she has already passed the Matriculation Examination with Mathematics as one of her subjects.

10. Each paper shall be of three hours and shall carry 100 marks. Each half paper shall be of an hour and a half and shall carry 50 marks.

11. As soon as possible after the Examination the Syndicate shall publish a list of the candidates who have passed, arranged in three divisions each in alphabetical order. Every successful candidate shall receive a certificate in the prescribed form.

12. The limits of the subjects are defined hereafter, and books shall be prescribed or recommended by the Syndicate, whenever necessary, to indicate the standard and extent of knowledge required in the different subjects.

## I

### A MAJOR VERNACULAR LANGUAGE

(*Bengali, Urdu, Assamese or Hindi*)

1. The course in a Major Vernacular Language shall include select texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies concerned.

The Syndicate shall also draw up, on the recommendation of the Board, a small selection of books by notable authors as showing the standard up to which pupils will be expected to have read.

2. Questions shall be set under the following heads :—

- (a) Passages from prescribed texts ;
- (b) Grammar and Composition ;
- (c) Translation from English into one of the recognised Vernaculars ;
- (d) Essays.

3. Candidates may be asked to explain, summarise and paraphrase the passages set or to answer any question thereon which will test their understanding of the meaning or the

construction of the passages. Questions shall not be set on the History of Language or Literature of the Vernacular.

4. The head "Grammar and Composition" shall include (a) questions involving the practical applications of the rules of grammar, (b) questions on the right use of words and phrases, and (c) exercises in composition.

5. Candidates will be required to write two essays one of which will be taken from books of general interest prescribed for rapid reading. Detailed knowledge of the contents of the books will not be required.

6. The distribution of the heads and marks in the two papers shall be as follows :—

<i>Paper I</i>	..	..	100 marks.
----------------	----	----	------------

Questions on the subject-matter and on the language of the prescribed texts :

Prose Text	..	..	60 marks.
Poetry Text	..	..	40 marks.

<i>Paper II</i>	..	..	100 marks.
-----------------	----	----	------------

(a) Grammar and Composition	..	25 marks.
(b) Translation from English into Vernacular	..	25 marks.
(c) Essays	..	50 marks.

## II

### ENGLISH

1. (i) The Matriculation Examination in English shall be a test (a) of ability to write clear, simple and correct English and (b) of intelligent comprehension of plain modern English on familiar subjects.

(ii) The course in English shall include select texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies in English. The Syndicate shall also draw up, on the recommendation of the Board, a small selection of books as showing the standard up to which pupils will be expected to have read.

(iii) The second paper in English shall include passages in one of the following Vernaculars for translation into English :—

Bengali, Urdu, Assamese, Hindi, Khasi, Garo, Manipuri, Nepali or Modern Tibetan.

The Syndicate shall have power to add to this list.\*

\* The following languages have been added to the list by the Syndicate : Santali, Uriya, Telugu, Marathi, Gujarathi, Maithili, Tamil, Kanarese, Malayalam, Lushai, Modern Armenian, Sinhalese, Sindhi and Panjabi (Gurumukhi).

2. Candidates may be asked to explain, summarise or paraphrase the passages set or to answer any question thereon which will test their understanding of the meaning or the construction of the passages. Questions shall not be set on the History of the English Language or Literature.

3. Under the head "Grammar" no formal definitions will be asked, but the questions will relate only to (a) practical applications of the rules of grammar, and (b) the right use of words and phrases.

4. Passages for translation may be narrative or descriptive or may consist of simple conversation on ordinary subjects. They must be such as may be easily rendered from one language into the other; they shall, where possible, be taken from recognised authors; and they shall not consist of any translation made for the purpose of the Examination from English into Vernacular.

5. For the purpose of Paper III (Half-paper) certain books of general interest written in simple English will be prescribed for rapid reading. The questions will be of a general character which may be answered from the prescribed books and will be set to test the candidates' power to write simple English. A large number of alternative questions will be allowed, and no detailed knowledge of the contents of the books will be required.

6. The distribution of the heads and of marks in the papers shall be as follows :—

<i>Paper I</i>	..	..	100 marks.
(a) Questions on the subject-matter and the language of the prescribed Prose Text	..	..	75 marks.
(b) Grammar	..	..	25 marks.
<i>Paper II</i>	..	..	100 marks.
(a) Questions on the subject-matter and the language of the prescribed Poetry Text	..	..	50 marks.
* (b) Translation from one of the recognised Vernaculars into English (two passages shall be set, of which one must be attempted)	..	..	20 marks.
(c) Letter-writing on simple topics	..	..	15 marks.
(d) Précis or substance writing	..	..	15 marks.
<i>Paper III (Half-paper)</i>	..	..	50 marks.
General questions from prescribed books as in (5).			

\* Note.—For pupils whose Vernacular is English or is one not recognised, alternative questions shall be set on English Composition or Unseen passages or Essay.

## III

## GEOGRAPHY

The course in Geography shall include the rudiments of General and Physical Geography together with the Geography of India in fuller details.

1. The earth's shape—rotation and revolution—day and night. Divisions of the earth's surface; latitude and longitude. Land forms and the action of the climatic forces upon them. Work of air, rain, rivers, oceans and glaciers on the earth's crust. Formation of soil.

The general relief of the globe, *i.e.*, the great slopes of the world as forming the continental water-partings and deciding the general distribution of rainfall.

The great oceans of the world and their relation to the great water-partings; winds and tides.

2. Outlines of the Geography of the world.

3. Geography of India in greater details than in 2 and including the following:—

Natural regions and surface features; climate; vegetation; animal life; distribution of minerals of economic importance; industries; population; and means of communication.

4. The drawing of simple plans and maps. Observations of temperature, rainfall and the direction of the wind.

Every recognised school must possess necessary apparatus for undertaking instruction in Geography. The list of apparatus required will be drawn up, from time to time, by the Syndicate on the recommendation of the Board of Studies in Geography,

Total number of marks in Geography .. 50 marks.

## IV

## HISTORY OF INDIA AND HISTORY OF ENGLAND

## (A) HISTORY OF INDIA

The course shall include a Reader on Indian History with special reference to North-Eastern India including a short account of the administration of British India and of the



progress of India under British rule. The course shall include the following :—

### Ancient Period

The physical features of India.

Peoples and languages.

The fundamental unity of Indian civilisation.

Pre-historic India and Indus civilisation.

Vedic India—The Aryans, their immigration and early settlements, literature, religion, political and social organisation.

Post-Vedic India—Up to 325 B.C.—The spread of Aryan civilisation to the Ganges valley and the Deccan ; the beginnings of Epic poetry—the rise of Jainism and Buddhism—Kingdoms and Republics preceding the Mauryas. The Persian and Macedonian invasions.

The Maurya Empire—Chandragupta—Asoka—the four Tamil Kingdoms—Political and Social Organisation of Maurya India.

The successors of the Imperial Mauryas in North-East India and the Deccan—the Satavahana Empire—the Kushan Empire—the Vikrama and Saka Eras.

The Gupta Empire—Samudragupta—the Vikramadityas—Fa Hien—Civilisation of the Gupta Age—the Huns and Yasodharman—Sasanka.

The Empire of Harsa—Hiuen Tsang—the decline of Kanauj—the Chalukya Empire in the South.

The Pala Empire in North-East India.

The Sena Kings of Bengal—the Muslim Conquest.

The colonial and maritime enterprise of the ancient Hindus. Hindu Civilisation.

### Mediaeval Period

Early Muslim Invasions.

The Early Turki Sultanate of Delhi.

The Khiliji Sultans.

The Tuglaks—Ibn Batuta—the Invasion of Timur.

The break-up of the Sultanate of Delhi—Independent Kingdoms of Northern India and the Deccan.

Bengal from the fall of the Sena Kings to the Mughal Conquest.

Religious and Cultural History up to the accession of Akbar.

Afghan-Mughal contest for empire in Hindusthan—the Lodis, Babar, Humayun, Sher Shah, Bairam Khan. The Mughal Empire under Akbar—Policy of religious toleration.

Jahangir.

Shah Jahan—The Taj Mahal.

Aurangzeb—the Rajput Revolt and the rise of the Marathas—Sivaji.

The break-up of the Mughal Empire and the ascendancy of the Marathas—Invasions of Nadir Shah and Ahmad Shah Durrani.

Condition of India under the Mughals.

Europeans in India, the Portuguese, the Dutch, the English, the French and other nations.

The Marathas, the Sikhs. Mysore.

The Nawabs of Murshidabad.

### Modern Period

The consolidation of British Power in Bengal and the Carnatic—the Conflict between the French and the English for supremacy in India.

The administrative reforms of Hastings and Cornwallis.

The Anglo-Maratha struggle for empire and the fall of the Mysore Sultanate—the Nepal War—Wellesley to Lord Hastings.

British expansion beyond the Brahmaputra and the Sutlej—Amherst to Dalhousie.

Social reform and educational progress—Bentinck to Dalhousie.

The Mutiny and the Settlement of 1858. The Queen's Proclamation.

Canning to Lytton.

Afghan policy and the annexation of Burma.

The first era of constitutional reforms—Ripon—Local Self-Government—Freedom of the Press—Legislative Councils—growth of Indian Nationalism.

Lansdowne and Curzon.

The second era of constitutional reforms—Partition of Bengal and its consequences—The Morley-Minto Reforms, the Delhi Durbar, the Montagu-Chelmsford Reforms. The Government of India Act, 1935.

The present administration of India—Its evolution.

Educational progress in India under British Rule.

Economic and material development under British Rule.  
Further constitutional progress.

## (B) HISTORY OF ENGLAND

1. The Mingling of the Races (down to the Norman Conquest).

The Romans, Saxons, Danes, Christianity in England, Victory of Christianity from Rome. The struggle of the Kingdoms and the consolidation of Britain. The contributions of Wessex and Alfred.

2. The Making of the Nation.

The Norman Conquest, its invigorating effect. Feudalism. The struggle between Church and State. The Crusades and their consequences. Struggle against the tyranny of the Crown. The Magna Charta. Attempts to bring Scotland and Wales into union with England. 'The Hundred Years' War with France. The Black Death and its effects. The Administration of Justice. The Growth of Parliament. The War of the Roses and the struggle for the Throne.

3. Decay of Feudalism. The Tudor Age.

Absolutism of the Tudors. The Renaissance and the Reformation. The New World. Development of commerce and sea-power. The rapture with Rome and the struggle between the Old and the New Religions. Policy of Elizabeth at home and abroad. The Religious Settlement. The Counter-Reformation. The war with Spain. The beginnings of the Empire. The Landmarks in the literature of the age. The Bible.

4. The Stuarts. The struggle for Liberty.

Growth of power of Parliament. The quarrel between Crown and Parliament. The Protectorate: its failure. The Restoration. Colonies and Maritime War. The expansion of the Empire. James II and the Revolution of 1688. The Bill of Rights. Union between England and Scotland. The war against France. The Supremacy of England in commerce and on the seas. Landmarks in Arts, Science, and Literature.

5. The German Kings. From Utrocht to Waterloo.

Whigs and Tories. Cabinet Government. Expansion of the Empire: war, exploration, commerce. The struggle with France, empire in America and India. Revolt of the American Colonies. The French Revolution: its effects. War with Revolutionary France and Napoléon. The Industrial Revolution. Industry, commerce and transport at the beginning of the XIXth century. Religious movements. Abolition of Slavery.

6. From Waterloo to the present.

Growth of the democratic movement. Religious toleration. The Reform Bill of 1832. Rise of the Conservatives. Free Trade. Political development in England under Victoria. Expansion of the Empire. The establishment of the British Power in India. Sepoy Mutiny and transfer of the administration of India from the East India Company to the Crown. England and her Colonies. The Dominions and Self-Government. The Great War. Landmarks in Arts, Literature, Science. The present political constitution in Britain and India. The relation between the constituent parts of the British Commonwealth. The League of Nations.

The marks shall be distributed as follows :—

History of India ..	..	60 marks.
History of England ..	..	40 marks.

V

MATHEMATICS

The course in Mathematics shall include Arithmetic, Algebra and Plane Geometry. The marks shall be divided as follows :—

Arithmetic ..	..	35 marks
Algebra ..	..	30 marks.
Plane Geometry ..	..	35 marks.

(a) *Arithmetic* :—The four Simple Rules, Vulgar and Decimal Fractions, Reductions, Extraction of Square Root, Practice, Proportion, Simple Interest, Present Worth, Discount, Stocks and Shares. Problems more easily solvable by Algebra should not be required to be solved arithmetically.

(b) *Algebra* :—The four Simple Rules, Proportion, Simple Equations, Resolution into Factors, Greatest Common Measure, Least Common Multiple, Graphs of Simple Equations.

(c) *Plane Geometry* :—

PRACTICAL

Bisection of angles and of straight lines.  
Construction of perpendiculars to straight lines.  
Construction of an angle equal to a given angle.  
Construction of parallels to a given straight line.  
Construction of triangles with given parts.

Division of a straight line into a given number of equal parts.  
Construction of a parallelogram equal to a given triangle  
and having one of its angles equal to a given angle.

Construction of a triangle equal in area to a given rectilineal figure.

Construction of a tangent to a circle.

Easy extensions of these constructions may be given as problems.

Candidates may be required to give the reasons for any particular construction involved in any question.

*Every candidate is required to provide himself with the following :—A hard pencil, dividers, pencil compasses and a straight ruler showing centimetres and inches.*

## THEORETICAL

### *Angles at a Point*

If a straight line stands on another straight line, the sum of the two angles so formed is equal to two right angles and the converse.

If two straight lines intersect, the vertically opposite angles are equal.

### *Parallel Straight Lines*

If a straight line, cutting two other straight lines, makes—

- (i) the alternate angles equal,
- (ii) two corresponding angles equal,
- (iii) the interior angles on the same side of the line supplementary,

then the two straight lines are parallel, and the converse.

Straight lines which are parallel to the same straight line are parallel to one another.

### *Triangles and Rectilineal Figures*

The sum of the angles of a triangle is equal to two right angles.

If the sides of a convex polygon are produced in order, the sum of the angles so formed is equal to four right angles.

Two triangles are equal in every respect—

- (i) if two sides and the included angle of one triangle are respectively equal to two sides and the included angle of the other ;

(ii) if two angles and a side of the one triangle are respectively equal to two angles and the corresponding side of the other.

If two sides of a triangle are equal, the angles opposite to the sides are equal and the converse.

Two triangles are equal in every respect, if the three sides of one triangle are respectively equal to the three sides of the other.

Two right-angled triangles are equal in every respect, if they have their hypotenuses equal and one side of the one equal to one side of the other.

If two sides of a triangle are unequal the greater side has the greater angle opposite to it and the converse.

Any two sides of a triangle are together greater than the third.

Of all the straight lines that can be drawn to a given straight line from a given point outside it, the perpendicular is the shortest.

The opposite sides and angles of a parallelogram are equal; each diagonal bisects the parallelogram and the diagonals bisect one another.

If there are three or more parallel straight lines and the intercepts made by them on any straight line that cuts them are equal, then the corresponding intercepts on any other straight line that cuts them are equal.

### *Areas*

Parallelograms on the same or equal bases and of the same altitude are equal in area.

Triangles on the same or equal bases and of the same altitude are equal in area.

Equal triangles on the same or equal bases are of the same altitude.

Illustrations and explanations of the geometrical theorems corresponding to the following algebraical identities :—

$$k(a + b + c \dots) = ka + kb + kc + \dots$$

$$(a + b)^2 = a(a + b) + b(a + b).$$

$$a(a + b) = a^2 + ab.$$

$$(a + b)^2 = a^2 + 2ab + b^2.$$

$$(a - b)^2 = a^2 - 2ab + b^2.$$

$$a^2 - b^2 = (a + b)(a - b).$$

The square on a side of a triangle is greater than equal to, or less than, the sum of the squares on the other two sides, according as the angle contained by those sides is obtuse, right

or acute. The difference in the cases of inequality is twice the rectangle contained by one of the two sides and the projection on it of the other.

### *Loci*

The locus of a point which is equidistant from two fixed points is the perpendicular bisector of the straight line joining the two fixed points.

The locus of a point which is equidistant from two intersecting straight lines consists of the pair of straight lines which bisect the angles between the two given lines.

### *The Circle*

A straight line drawn from the centre of a circle to bisect a chord, which is not a diameter, is at right angles to the chord ; conversely, the perpendicular to a chord from the centre bisects the chord.

There is one circle, and one only, which passes through three given points not in a straight line.

In equal circles (or in the same circle) (i) if two arcs subtend equal angles at the centre, they are equal ; (ii) conversely, if two arcs are equal, they subtend equal angles at the centre.

In equal circles (or in the same circle) (i) if two chords are equal, they cut off equal arcs ; (ii) conversely, if two arcs are equal, the chords of the arcs are equal.

Equal chords of a circle are equidistant from the centre, and the converse.

The tangent at any point of a circle is perpendicular to the radius through the point.

If two tangents are drawn to a circle from an external point (i) they are equal, (ii) they subtend equal angles at the centre of the circle.

If two circles touch, the point of contact lies on the straight line through the centres.

The angle which an arc of a circle subtends at the centre is double that which it subtends at any point on the remaining part of the circumference.

Angles in the same segment of a circle are equal ; and if the line joining two points subtends equal angles at two other points on the same side of it, the four points lie on a circle.

The angle in a semicircle is a right angle ; the angle in a segment greater than a semicircle is less than a right angle ; and the angle in a segment less than a semicircle is greater than a right angle.

The opposite angles of any quadrilateral inscribed in a circle are supplementary and the converse.

If a straight line touch a circle and from the point of contact a chord be drawn, the angles which this chord makes with the tangent are equal to the angles in the alternate segments.

If two chords of a circle intersect either inside or outside the circle, the rectangle contained by the parts of the one is equal to the rectangle contained by the parts of the other.

*On the Concurrence of Straight Lines in a Triangle*

(i) The perpendiculars drawn to the sides of a triangle from their middle points are concurrent.

(ii) The bisectors of the angles of a triangle are concurrent.

(iii) The medians of a triangle are concurrent.

(iv) The perpendiculars from the vertices of a triangle to the opposite sides are concurrent.

Each question on theoretical Geometry shall consist of a theorem contained in the above schedule together with an easy deduction.

Any proof of a proposition shall be accepted, which appears to the Examiners to form part of a systematic treatment of the subject, but proofs of theorems should, as far as possible, be based on first principles. The order in which the theorems are stated in the above schedule is not to be regarded as essential.

In the proof of theorems and deductions from them, it shall be permissible to use hypothetical constructions.

The ordinary symbolical abbreviations may be used.

## VI

### A CLASSICAL LANGUAGE

#### (A) SANSKRIT

1. The course in Sanskrit shall include simple pieces in prose and verse, selected from standard works in Classical Sanskrit, to be prescribed, from time to time, by the Syndicate on the recommendation of the Board of Studies concerned.

2. A book of elementary Sanskrit Grammar shall also be prepared and prescribed by the University.

3. The marks in the paper in Sanskrit shall be distributed as follows :—

(i) Passages from the prescribed texts for translation into English or into one of the Major Vernaculars as



well as for explanation, either in Sanskrit or in a Major Vernacular, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks .. .. 60 marks.

- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction 20 marks.
- (iii) Translation of simple sentences from English into Sanskrit. Such sentences shall, in no case, be translations of portions of the prescribed texts .. .. 20 marks.

### (B) PALI

1. The course in Pali shall include simple pieces in prose and poetry, selected from early standard works in Pali literature, to be prescribed, from time to time, by the Syndicate on the recommendation of the Board of Studies concerned.

2. Grammars will be recommended from time to time.

3. The marks in the paper in Pali shall be distributed as follows :—

- (i) Passages from the prescribed texts for translation into English or into one of the Major Vernaculars as well as for explanation, either in Pali or in a Major Vernacular, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks .. .. 60 marks.
- (ii) Questions involving practical use of the elementary rules of Grammar including passages containing grammatical errors for correction .. 20 marks.
- (iii) Translation of simple sentences from English into Pali. Such sentences shall, in no case, be translations of portions of the prescribed texts .. 20 marks.

### (C) ARABIC

1. The course in Arabic shall include pieces in prose and verse, selected from standard works in Classical and Modern Arabic, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. A book of Elementary Arabic Grammar shall also be prepared and prescribed by the University.

3. The marks in the paper in Arabic shall be distributed as follows :—

- (i) Passages from the prescribed texts for translation into English or into one of the Major Vernaculars as well as for explanation, either in Arabic or in a Major Vernacular, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks . . . . . 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction . . . . . 20 marks.
- (iii) Translation of simple sentences from English into Arabic. Such sentences shall, in no case, be translations of portions of the prescribed texts . . . . . 20 marks.

#### (D) PERSIAN

1. The course in Persian shall include simple pieces in prose and verse, selected from standard works in Classical and Modern Persian, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. A book of Elementary Persian Grammar shall also be prepared and prescribed by the University.

3. The marks in the paper in Persian shall be distributed as follows :—

- (i) Passages from the prescribed texts for translation into English or into one of the Major Vernaculars as well as for explanation, either in Persian or in a Major Vernacular, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks . . . . . 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction . . . . . 20 marks.
- (iii) Translation of simple sentences from English into Persian. Such sentences shall, in no case, be translations of portions of the prescribed texts. . . . . 20 marks.

#### (E) GREEK

1. The course in Greek shall consist of portions in prose and verse from suitable easy standard Attic writers and of easy

portions of the New Testament, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. The marks in the paper in Greek shall be distributed as follows :—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks . . . . . 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction 20 marks.
- (iii) Translation of simple sentences from English into Greek. Such sentences shall, in no case, be translations of portions of the prescribed texts. 20 marks.

#### (F) LATIN

1. The course in Latin shall consist of portions in prose and verse from suitable easy standard authors. The course shall include select texts to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. The marks in the paper in Latin shall be distributed as follows :—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks . . . . . 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction 20 marks.
- (iii) Translation of simple sentences from English into Latin. Such sentences shall, in no case, be translations of portions of the prescribed texts. 20 marks.

#### (G) CLASSICAL ARMENIAN

1. The course in Classical Armenian shall include select texts to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. Books on Grammar will be recommended from time to time.

3. The marks in the paper in Classical Armenian shall be distributed as follows :—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks .. .. 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction 20 marks.
- (iii) Translation of simple sentences from English into Classical Armenian. Such sentences shall, in no case, be translations of portions of the prescribed texts. .. .. 20 marks.

#### (H) HEBREW

1. The course in Hebrew shall include selections from easy portions of the Old Testament, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. The marks in the paper in Hebrew shall be distributed as follows :—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks .. .. 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction 20 marks.
- (iii) Translation of simple sentences from English into Hebrew. Such sentences shall, in no case, be translations of portions of the prescribed texts. 20 marks.

#### (I) SYRIAC

1. The course in Syriac shall include selections from the Peshitto Version of the New Testament and from some non-official authors, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. The marks in Syriac shall be distributed as follows :—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks .. .. 60 marks.

- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction 20 marks.
- (iii) Translation of simple sentences from English into Syriac. Such sentences shall, in no case, be translations of portions of the prescribed texts. 20 marks.

## (J) CLASSICAL TIBETAN

1. The course in Classical Tibetan shall include simple pieces in prose and verse, selected from standard works in Tibetan literature, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. Books on Grammar will be recommended from time to time.

3. The marks in the paper in Classical Tibetan shall be distributed as follows :—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks .. .. 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction .. 20 marks.
- (iii) Translation of simple sentences from English into Tibetan. Such sentences shall, in no case, be translations of portions of the prescribed texts. 20 marks.

## (K) ALTERNATIVE VERNACULAR OR ADDITIONAL ALTERNATIVE VERNACULAR

1. The course shall include selections in prose and verse from the writings of standard authors, to be prescribed, from time to time, by the Syndicate on the recommendation of the Board of Studies concerned.

2. The marks shall be distributed as follows :—

- (i) Questions on the subject-matter and language of the prescribed text .. .. 50 marks.
- (ii) Questions on Grammar and Composition 20 marks.
- (iii) Essay .. .. 30 marks.

The Essay will be set from books of general interest prescribed for rapid reading. •

No detailed knowledge of the contents of the books will be required.

## (L) A MODERN EUROPEAN LANGUAGE OTHER THAN ENGLISH

*(French, German, Italian or Portuguese)*

1. The course shall consist of portions in prose and verse from standard writers of the language concerned. The course shall include select texts to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. The marks in the paper shall be distributed as follows :—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks .. .. 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction .. 20 marks.
- (iii) Translation of simple sentences from English into the language concerned. Such sentences shall, in no case, be translations of portions of the prescribed texts .. .. 20 marks.

## VII

## ELEMENTARY SCIENTIFIC KNOWLEDGE

1. Observation and identification of the principal constellations, major stars and planets throughout the year at night. The Sun—its dimension and distance from the Earth. Planetary system—relative positions. Solar year and seasons. The Moon and its phases—lunar year. Eclipses of Sun and Moon. Comets and meteors.

2. The Earth—condensation from a hot gaseous state—its crust—igneous and sedimentary rocks. Probable condition of the interior of the Earth. Earth movements (earthquake)—folding, landslide, volcano. Varieties of soil and their bearing on plant-life and agricultural operations. The story of the formation of coal and mineral oil.

3. Structure of any common flowering plant. Functions of root, stem, leaf, flower and fruit. Special characteristics of the living—locomotion, respiration, nutrition, growth, response to stimulus, propagation and death; adaptation to environments. Examples from plants like rice and pea, and animals like earth-worm and fish. Life-history of (a) rice and pea and (b) ant, bee, spider, mosquito, butterfly and frog. Interdependence of plants and animals.

4. Simple consideration of the Human Body, and its principal systems, *viz.*, circulatory, respiratory and digestive systems. Foods—their relative values and their essential ingredients. Functions of the skin and nerves.

5. The three states of matter. Physical properties of air and water. Buoyancy and Archimedes' principle. Pressure of atmosphere. Effect of heat on water. Effect of heat on air. Ventilation. Effect of heat on solid bodies. Pendulum Clock and Thermometer. Transference of heat. Simple ideas regarding energy and its transformations with examples. Rectilinear propagation of light. Phenomena of reflection and refraction of light, colour and rainbow. Lodestone, magnetisation, terrestrial magnetism and compass. Single Electric Cell. Conductors and insulators. Effects of current: (a) heating and lighting, (b) chemical, (c) magnetic. Electro-magnet and Electric Bell. Telegraphy.

6. Separation of Mixtures—solution, filtration, crystallisation, distillation, sublimation. Rusting of iron and burning of candle, magnesium and sulphur in a closed volume of air over water. Air, its composition. Properties of Oxygen, Nitrogen and Carbondioxide. Water, its composition. Properties of Hydrogen. Natural and aerated waters. Properties of hard and soft water. Characteristics of chemical compounds.

Candidates will be expected to have had a training in observation and in accurate and clear description, with reference to their practical applications and phenomena as observed in daily life. No detailed technical knowledge will be required.

Questions should be distributed over different portions of the syllabus and should be sufficiently varied and numerous to allow considerable option.

## VIII

### ELEMENTS OF PHYSICS AND CHEMISTRY

#### (A) PHYSICS

1. (1) Matter and its three states; (2) measurements of length, angle, time, area, volume; (3) velocity, acceleration and force; (4) mass, work and weight; (5) the balance, density; (6) principle of Archimedes; (7) pressure of air; (8) simple barometer; (9) energy and conservation of energy.

2. Heat—(1) Expansion of solids, liquids and gases; (2) temperature; (3) thermometers; (4) melting and boiling points; (5) conduction; (6) convection; (7) radiation; (8) specific heat; (9) change of state; (10) mechanical equivalent of heat.

3. Sound—(1) Nature of sound ; (2) its production and transmission.

4. Light—(1) Rectilineal propagation of light ; (2) illumination ; (3) laws of reflection and formation of images with plane, concave and convex mirrors ; (4) refraction ; (5) use of concave and convex lenses ; (6) prisms and their action on white light ; (7) colour ; (8) rainbow.

5. Magnetism—(1) Attraction and repulsion ; (2) natural and artificial magnets ; (3) terrestrial magnetism ; (4) magnetic meridian ; (5) the compass.

6. Electricity—(1) Electrification by friction ; (2) positive and negative electricity ; (3) properties of a charged body ; (4) conductors and insulators ; (5) the electroscope ; (6) induction ; (7) the electrophorus ; (8) simple voltaic cells ; (9) magnetic and heating effect of a current ; (10) electromagnets ; (11) the simple galvanoscope ; (12) simple explanation of telegraphy ; (13) electric bell ; (14) electric light ; (15) telephones ; and (16) simple explanation of thunder and lightning.

*N.B.*—The course should be treated in an elementary manner and should be fully illustrated by suitable experiments. Records of demonstration shall be kept by students for inspection.

## (B) CHEMISTRY

1. (1) Scope of Chemistry ; (2) elements and compounds, mechanical mixture, solutions ; (3) filtration, crystallisation, distillation, sublimation ; (4) states of matter ; (5) melting and boiling points.

2. (a) Chemical combination—illustrated by (1) candle burning in air, (2) magnesium ribbon burning in air, and (3) sulphur burning in air.

(b) Chemical decomposition—illustrated by (1) action of sodium on water, (2) heating mercuric oxide, and (3) heating potassium chlorate.

3. Air, its composition ; preparation of oxygen and nitrogen, and study of their properties.

4. (1) Water, its composition ; (2) Preparation and properties of Hydrogen ; (3) Hard and soft water.

5. (1) Phenomena of burning and rusting ; (2) Conservation of mass.

6. Study of (1) three forms of carbon, (2) oxides of carbon, (3) coal, (4) sulphur and its oxides.

7. Atoms and molecules.

8. Definition of acids, bases and salts.



9. Study of the following metals :—Iron, Magnesium, Mercury, Zinc ; their properties and uses.

*N.B.*—The course should be treated in an elementary manner and should be fully illustrated by suitable experiments. Records of demonstration shall be kept by pupils for inspection.

The Examination shall consist of one paper of two halves, one in Physics and one in Chemistry. The marks shall be distributed as follows :—

Physics	50
Chemistry	50

## IX

### MENSURATION AND SURVEYING

The course in Mensuration and Surveying shall include :—

(a) *Geometry* : Practical—As under Mathematics (Compulsory).

The candidate is required to learn the use of Dividers, Compasses, Straight-ruler and Protractor.

(b) *Construction of Scales*—

(i) Construction of a scale of equal parts.

(ii) Construction of a decimal diagonal scale.

(c) *Mensuration of Lines*—

Tables of Lineal Measure—Right-angled triangle—Altitude of a triangle—Similar triangles—Chords of a circle—Circumference of a circle —Regular figures.

(d) *Mensuration of Surfaces*—

Tables of Square Measure—Rectangle. Parallelogram. Triangle. Quadrilateral. Irregular Rectilineal figures—Circle, Cone, Sphere.

(e) *Mensuration of Volumes*—

Parallelepiped, Prism, Cylinder, Pyramid, Cone, Sphere.

(f) *Land Surveying*—

Use of the Chain—of the Offsets—of the Cross-staff—of the Field-Book. Simpson's Rule.

## X

### ELEMENTARY MECHANICS

The course in Elementary Mechanics shall include :—

I. Motion—

Varieties of motion.

Elementary notions of speed, velocity and acceleration.

Motion of a body with constant acceleration.  
Composition and resolution of motions.  
Bodies falling freely under gravity.  
Special cases of bodies falling under gravity (inclined plane, projection in any direction, etc.)  
General idea of work and energy ; Kinetic Energy and Potential Energy.

## II. Force—

Elementary notions of mass, inertia and momentum.  
Newton's Laws of Motion.  
Units of Force : poundal, dyne.  
Relation between mass and weight.  
Moments.  
Impulsive forces—impulse.  
Balancing of forces.  
Conditions for the equilibrium of three forces not parallel.  
Triangle and parallelogram of forces.  
Conditions for the equilibrium of three parallel forces.  
Centre of parallel forces.  
Centre of gravity. Mass-centre. Position of centre of gravity in stable and unstable equilibrium.  
Methods of finding the centre of gravity of systems of particles in elementary cases.  
Mass-centre of a triangle—of the perimeter of a triangle—of two bodies whose individual mass centres are given.  
Illustrations of conditions of equilibrium in simple machines ; levers ; balance ; pulleys ; inclined plane.

The subject is to be treated mainly experimentally. No knowledge of Mathematics except such as may be necessary for elucidating experiments and as may fall within the limits of the Matriculation Mathematics (Compulsory) shall be required.

## XI

### ELEMENTARY HYGIENE

The course in Hygiene shall include—

1. Introduction—Definition of Hygiene—Personal and Public—a short history of the development of modern public health work—Public health a summation of personal health.
2. General structure and functions of the human body—
  - (a) The cell—different kinds of tissues—bone—muscle—nerve. The central nervous system and special senses.

- (b) Digestion—functions of mouth, stomach, intestine, liver, pancreas.
  - (c) Blood and its circulation—Heart and blood vessels.
  - (d) Respiration—air passages—lungs.
  - (e) Excretion—kidneys—bladder.
  - (f) Skin.
  - (g) Body temperature—the production and loss of heat  
—Heat control in cold and warm weather—clothing  
—bathing.
3. Health—what is health—value of health.
4. Exercise—the importance of exercise—effects of exercise on circulation, respiration, muscles, skin and nutrition—forms of exercise—good and bad posture—evil effects of bad posture.
5. Environment—
- (a) What is meant by environment.
  - (b) Essential features of good environment.
  - (i) Sunlight—health values of sunlight.
  - (ii) Air—the relation of weather and outdoor air to health—indoor air and health—harmful constituents of outdoor and indoor air—ventilation—natural ventilation—window ventilation—mechanical ventilation—bad effects of overcrowding—common air-borne diseases—purification of air, natural and artificial.
  - (iii) Soil—Sanitary significance of soil—pollution of soil and bacterial diseases, *e.g.*, Tetanus, Typhoid, Cholera, Dysentery—soil and its connection to hook-worm infection.
  - (iv) (a) Water—hard and soft water—importance of water in relation to health—sources of water—water cycle—rain water—surface water—ground water—spring water—pollution of water—natural purification.
  - (b) Water supply in Bengal—tanks, wells, tube-wells, streams—how to avoid pollution—reserved tanks.
  - (c) Common methods of purification of water—filtration—filter beds—mechanical filter; evils of improper domestic (*ghara*) filters; purification by the use of chemicals—use of permanganate and chlorine—boiling—distillation.
  - (d) Storage and distribution of water in houses and institutions and in villages and towns; water-borne diseases; evil effects of impure water and dangers of scarcity of water.
  - (v) (a) Dwelling Houses—selection of site; houses to be constructed on well-thought-out plans; plenty of light and air; protection against damp; good drainage; privies, cowsheds and stables at some distance from the main building; sufficient open space between contiguous houses; adequate arrangements for disposal of refuse and filth.
  - (b) Huts in villages; low lands to be avoided; plinth well-raised; sufficient number of openings for light and air in each

room ; situation of latrines and cowsheds ; arrangements for drainage and disposal of sewage.

(vi) Food—its principles and their respective functions and the importance of each in relation to growth and maintenance of health. The value of milk and milk products—General composition of common food-stuffs—importance of varied diets and avoidance of monotony—cooking—food adulteration—food in relation to disease (food poisoning).

#### 6. Sources and modes of spread of diseases—

(i) *Man*—‘Droplet infections, carried from one person to another by coughing, sneezing, etc. ; common colds, influenza, pneumonia, diphtheria, tonsillitis, tuberculosis and small-pox carried in this way—carriers.

Remedies—Avoid overcrowding in home, sleeping rooms, schools and elsewhere.

(ii) *Water and food*—In relation to Cholera, Typhoid, Dysentery, etc.

(iii) *Insects*—Mosquitoes, flies, fleas, lice, etc., in relation to malaria, dengue fever, plague, relapsing fever, etc.

Remedies—prevention of breeding and control of mosquitoes and flies.

(iv) *Animals as sources of infection*—Tuberculosis in cattle and hogs—Tetanus—Enteritis—Plague—Rabies.

#### 7. Prevention of disease—Methods for control of communicable disease—

(i) Immunization (Cholera, Typhoid, Diphtheria and Small-pox, as examples).

(ii) Quarantine and isolation (chicken-pox, measles, whooping cough and plague, as examples).

(iii) Sanitation—

(a) A good system of filth-removal and waste disposal, water conservancy. direct disposal of sewage ; balanced filter, trenching, septic tank, incineration.

(b) Avoidance of pollution of soil, water, food and air.

(c) Common methods of disinfection of rooms, beddings, clothes, excreta, and other infected materials.

(iv) Health Education.

#### 8. Community Health problem—

(a) Tuberculosis as a community health problem—community health and tuberculosis demonstrations—tuberculosis in Bengal—developing an organised attack against tuberculosis, sanatoria, etc.

(b) Malaria as a community health problem—village sanitation—restoration of natural drainage—preventive measures—anti-malarial societies—necessity of co-operation.

9. Health of the school child—health education—health inspection—medical examination—health promotion—sanitation of buildings and grounds—physical training—hygiene teaching.

10. Personal Hygiene—An application in one's daily life of the principles and knowledge acquired above. Care of teeth, hair and skin. Eye-sight and its preservation. Clothing according to climate and occupation.

*Note.*—It is not intended that candidates should be examined in Chemistry, Anatomy, Physiology or like contributory subjects, but the students should be taught with the aid of experiments such simple facts in these contributory subjects as may be essential for an elementary scientific knowledge of Hygiene.

11. Mental Hygiene—close relation between body and mind—the three main instincts, ego, sex and social—choice of occupation and mental hygiene—personality culture including education in feelings like fear, anger, etc., and education in ideas like perception, memory, imagination and thought—mental hygiene of the pre-school and school child.

*N.B.*—A. The following experiments should be shown to the students in the class or in the laboratory :—

- (1) Products of oxidation.
- (2) Products of respiration.
- (3) Action of saliva on starch.
- (4) Action of pepsin and hydrochloric acid on boiled meat or gelatine.
- (5) Action of Benedict's or Fehling's Solution on sugar solution on boiling.
- (6) Effect of evaporation on wet-bulb thermometer.
- (7) Use of filter-paper.
- (8) Distillation.
- (9) Action of a weak acid solution and a weak alkaline solution and milk on litmus papers.
- (10) Specific gravity of milk and water.
- (11) Action of alum on muddy water.

B. The following microscopic slides should be shown to the students :—

- (1) A living cell, *e.g.*, yeast or any unicellular organism.
- (2) Blood-cells.
- (3) Cells composing different tissues, *e.g.*, muscle cells, nerve cells, epithelium cells, etc.

C. The following activities should be encouraged :—

- (1) Measuring height and weight every month or quarterly.
- (2) Recording of dry-bulb, wet-bulb, and barometric readings of the class room every day.
- (3) To submit report on the sanitation of classes, school building and school playgrounds.
- (4) To keep a record of health habits of the students of the class.

The above list is not exhaustive.

## XII

## ELEMENTS OF BIOLOGY

Types of life ; plants and animals ; their distinction. Classification into main groups and the necessity for such a scheme. Homology and analogy. Man's relationship to the rest of the animal kingdom. Protoplasm and its functions. The cell and its structure. Unicellular and multicellular organisms. Outlines of evolution and heredity. Bilateral and radial symmetry. Metamorphosis of animals. Social habits of wasps, bees and termites. Animal and plant colouration. Mimicry. Elementary knowledge of the essential functions of a living organism ; nutrition and growth, source of food of plants and animals, photo-synthesis ; circulation of the nutritive materials ; excretion ; reproduction and germination ; sensation and movement in plants and animals.

Floral parts, simple and compound leaves. Pollination of plants by animals. Dispersal of seeds by animals or other agencies. Elementary knowledge of the structure of the following types :—

- (1) Animal—Earthworm, Apples nail (Pila), Palaeman, Cockroach and Toad.
- (2) Plant—A Fern (Aspidium or Pteris), flowering plants (gram or pea plant and onion plant).

## PRACTICAL

(1) Candidates shall dissect and draw the coarse anatomy of the above types, including the circulatory, alimentary, excretory, nervous, reproductive and skeletal systems of the animals, and the external and internal morphology of the plants.

(2) Microscopic demonstrations of *Amœba*, *Paramœcium*, *Hydra* and the elementary tissues of the Toad ; a fungus (*Mucor* or *Yeast*), *spirogyra*, moss.

Apparatus required for a class of twenty pupils :—

One Microscope (students' type) for demonstration purpose.

Two dissecting lenses on stands.

Twenty dissecting dishes.

Pupils must provide themselves with their own dissecting cases, containing scissors, scalpels, mounted needles and forceps ; also glass slide and cover slips.

*N.B.*—There shall be no practical examination held by the University but every candidate who desires to be examined in this subject must produce (a) a certificate from the Head Master of the school from which he appears to the effect that he has completed the practical course, prescribed by the Regulations and (b) a record of the practical work done by him.

## XIII

## ADDITIONAL MATHEMATICS

The course in Additional Mathematics shall include, in addition to the syllabus for the Compulsory Mathematics, the following :—

(A) Arithmetic—Compound Interest ; Exercises in the Metric System ; Approximation to a specified degree of accuracy including contracted processes.

(B) Algebra—Quadratic Equations with one unknown quantity ; Extraction of Square Root ; Graphs of Pure Quadratic Equations (excluding constructions with different scales along two axes) ; Arithmetical and Geometrical Progressions ; the Elementary Laws of Indices.

(C) Geometry—

## PRACTICAL

Simple cases of the construction of circles satisfying given conditions.

Construction of regular figures of 3, 4, 5 or 6 sides in or about a given circle.

Construction of a square equal in area to a given rectangle.

## THEORETICAL

*Proportion : Similar Triangles*

If a straight line is drawn parallel to one side of a triangle, the other two sides are divided proportionally ; and the converse.

If two triangles are equiangular, their corresponding sides are proportional ; and the converse.

If two triangles have one angle of the one equal to one angle of the other, and the sides, about these equal angles proportional, the triangles are similar.

If a polygon is divided into triangles by a line joining a given point to its vertices, any similar polygon can be divided into corresponding similar triangles.

The ratio of the areas of two similar triangles, or of two similar polygons, is equal to the ratio of the squares on the corresponding sides.

The internal bisector of an angle of a triangle divides the opposite side internally in the ratio of the sides containing the angle ; and likewise the external bisector externally.

## (D) Trigonometry—

Measurement of angles ; Sexagesimal and Centesimal Measure ; Circular or Radian Measure.

Trigonometrical ratios for angles less than a right angle—  
Trigonometrical Ratios for  $0^\circ$ ,  $30^\circ$ ,  $45^\circ$ ,  $60^\circ$ ,  $90^\circ$ .

Simple Problems in Heights and Distances.

The distribution of marks shall be as follows :—

(A) Arithmetic	..	..	30 marks.
(B) Algebra	..	..	25 "
(C) Geometry	..	..	30 "
(D) Trigonometry	..	..	15 "

## XIV

## BUSINESS METHOD AND CORRESPONDENCE

The course in Business Method and Correspondence shall include—

1. Writing of business letters and announcements ;
2. Characteristics and parts of a business letter ;
3. The treatment of outgoing correspondence, preserving copies, indexing, précis writing, filing inward correspondence, docketing, addressing envelopes, etc. ;
4. Drafting of advertisements ;
5. Various modern office appliances ;
6. Telegram (including codes) ;
7. Business Forms such as Invoices, Statements, Receipts, Cheques, Paying-in slips, Debit and Credit Notes, Bills of Exchange, etc. ;
8. Preparation of the above Commercial forms from particulars given ; Different kinds of books kept in an office—their nature and contents ;
9. Methods adopted in Export and Import Trade ;
10. Banks and their services ;
11. Coins and weights and measures of principal countries ;
12. Sale of goods ;
13. A general knowledge of business undertakings—Partnerships : Private and Limited ;
14. An elementary knowledge of Joint Stock Companies' procedure ;
15. Necessary Books, Forms, Returns, etc. ;
16. Business terms and abbreviations ;
17. Insurance and its importance.



## XV

## COMMERCIAL GEOGRAPHY

The course in Commercial Geography shall include the following :—

1. Early Trade and Traders ; Great Discoveries ; Trade and Traders of to-day ; Importance of Commercial Geography ; Influence of Physical features and climate on Commerce ; Climatic belts ; Vegetation regions.

2. Configuration and position—Mountains—Rivers—Nature of coasts—a general idea of their influence upon distribution of population, occupations, industries and transport of a country.

3. Principal products of the World :—Agricultural—Pastoral—Mineral—Manufacturing ; their chief places of origin and important markets.

4. An elementary knowledge of the causes of the rise and growth of Towns, Ports and Markets.

5. Modes of Transport ; Railways and Commerce ; Ocean Highway—Ports, Atlantic Highway, Pacific Highway and Indian Highway.

6. Economic Geography of India with special reference to (a) Soils, (b) Climate, (c) Principal Agricultural, Pastoral and Mineral products, (d) Principal Industries, (e) Cities and Ports, (f) Nature and direction of foreign trade, (g) Internal trade, (h) Communication, (i) Irrigation, and (j) Source of Power.

## XVI

## ELEMENTS OF PUBLIC ADMINISTRATION IN INDIA

Historical Survey—The East India Company as a Trading Corporation—the territorial possessions of the East India Company—the grant of Dewani—the Regulating Act of 1773—Pitt's India Act of 1784—Renewals of the Company's Charter—The Charter Act of 1833—The Sepoy Mutiny and the transfer of the administration of India to the Crown. The India Councils Act of 1861—The Act of 1892—The Morley-Minto Reforms of 1909—the announcement of August, 1917—The Montagu-Chelmsford Report—The Government of India Act of 1919—The Government of India Act, 1935.

The Secretary of State for India and his Advisers—The Government of India—The Governor-General and His Majesty's Representative—The Federation of India—The Federal

**Executive—Council of Ministers—Provisions as to defence, ecclesiastical affairs, external affairs, and the tribal areas—special responsibilities of Governor-General—Executive Departments—The Army—The Secretariat.**

**The Federal Legislature—Its composition and functions—Relation between the two Houses.**

**The Provincial Governments—The Governor—Council of Ministers—The Provincial Secretariat—The Departments of Administration—The Provincial Legislature.**

**The control exercised by the Governor-General over the Provincial Governments.**

**The District Administration—Sub-districts.**

**The Judiciary—The Judicial Committee of the Privy Council—The Federal Court—The High Courts—The Subordinate Judiciary.**

**The Public Service.**

**Finance—The Principal sources of revenue and the main heads of expenditure of the Federal and the Provincial Governments—the Public Debt of India.**

**The Indian States.**

**Local Self-Government—The beginnings of Municipal administration—Lord Mayo's Resolution—Lord Ripon's Resolution—Municipalities, Improvement Trusts, District Boards and other Rural Boards—Local Finance—Chief sources of income of local bodies—Main heads of expenditure.**

## XVII

### ADDITIONAL ENGLISH

The course in Additional English shall include selected texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies concerned.

The marks in the paper shall be distributed as follows :—

- |   |       |           |
|---|-------|-----------|
| (i) Questions on the subject-matter and language of the prescribed text | .. .. | 50 marks. |
| (ii) Questions on Grammar and Composition                               | .. .. | 20 marks. |
| (iii) Essay   | .. .. | 30 marks. |

The Essay will be set from books of general interest prescribed for rapid reading.

No detailed knowledge of the contents of the books will be required.

## XVIII

ARITHMETIC AND DOMESTIC SCIENCE INCLUDING  
DOMESTIC HYGIENE*(For Girls only)*

Arithmetic	..	..	35 marks.
Domestic Science including Domestic Hygiene			65 marks.

## Arithmetic

The four Simple Rules, Vulgar and Decimal Fractions, Reductions, Extraction of Square Root, Practice, Proportion, Simple Interest, Present Worth, Discount, Stocks and Shares, Problems more easily solvable by Algebra should not be required to be solved arithmetically.

## Domestic Science including Domestic Hygiene.

1. The House—(a) Location—site and accommodation. Plenty of air and sunlight. The importance of sunlight to health.

(b) Air and Ventilation—The composition of air; simple methods of detecting oxygen and carbon dioxide in the air; quantity of fresh air required for each individual; changes in air due to human habitation; impurities in air; effect of occupants on air of rooms; the importance of fresh air specially in connection with common air-borne diseases, *e.g.*, Tuberculosis, etc., The main principles involved in ventilation. Simple methods of purification of air.

(c) Water—Quantity of water required for each person; sources of water-supply; sources of impurities; hard and soft water; method of softening hard water and its reaction to soap; reservation and storage of water; water as carrier of disease; filtering, boiling and other simple household methods of purification.

(d) Decoration, etc.—Furniture and equipment; cleanliness and repairs; avoidance of germs, insects and pests in the house.

(e) Drainage, etc.—Removal of dry refuse; flush systems; importance of some form of village latrines; influence on health of defective and dirty drains; the compound.

II. Laundry work—(a) Choice and care of laundry utensils; simple experimental work to illustrate the removal of dirt and stains.

(b) The composition and effect of soda, starch, blue, etc., as used in laundry work.

(c) Methods of washing and finishing household linen; white and coloured cotton materials, silk and woollen garments.

III. Cookery—(a) Food—its principles (protein, fat, carbohydrates, salts, vitamin and water); their functions; the importance of proteids and vitamins to the young child and youth; the great value of milk and milk-products in childhood and youth; the general composition of the common food-stuffs; importance of varied diet and avoidance of monotony; common adulteration of food; food in relation to disease.

(b) Choice of food and their cost.

(c) Management of store rooms; planning menus for the home.

(d) Methods of cooking—economy of fire in the kitchen.

IV. Domestic Economy—(a) Petty cash book and its maintenance; cheques; Paying book and Pass book.

(b) Income and expenditure—Domestic Budget, unforeseen items; necessity of saving.

(c) Life Insurance—Different types of policies and payment of premiums.

(d) Possibilities of supplementing family income—Home industries.

V. Personal Hygiene. (A general knowledge of the elementary structure and functions of the human body is taken for granted.)

Breathing; rest and exercise; bathing with care of teeth, hair and skin; use and action of soap; cleanliness of person; relative hygienic values of cotton, linen, wood, silk; clothing, bedding.

VI. Infection and disinfection—Simple facts concerning common infectious diseases; insects as carriers of disease; common methods of disinfection.

VII. Simple home nursing—Care of sick room; care of patient; invalid cookery and administration of medicine; keeping of records for doctor's use.

*Note.*—The pupil should be taught with the aid of experiments such simple facts as may be essential for an elementary scientific knowledge of "Domestic Science and Domestic Hygiene."

## XIX

### SEWING AND NEEDLEWORK

*(For Girls only)*

The Examination will be practical and written, and will be so arranged as to test the candidate's skill in the cutting out and making of the garments mentioned in the list for children and adults, as well as her knowledge of the nature of materials commonly used for these garments.

**40 marks.**

Questions will be set on the following subjects :—

1. The most suitable materials to be used for garments, their source, hygienic qualities, uses and cost.
2. Simple methods of pattern-making.
3. Drawing a diagram of any simple garment.
4. The cutting out of garments and their construction.
5. The various stitches and processes used in plain and decorative needlework.
6. Methods of patching and darning and general repairs.
7. Machining, management and care of the Sewing Machine.

.. 30 marks.

Each candidate may be required to cut out, from given measurements, any garment or the section of a garment specified in the given list, and to tack together or make such portions as may be indicated at the time of the examination.

*N.B.*--Candidates must bring with them to the practical examination a ruler, a red and blue pencil, cotton, needles, pins, a thimble, scissors and a tape measure, and to the theoretical examination a ruler and a pencil.

The necessary materials will be provided by the University.

.. **30 marks.**

Each candidate will be required during the preceding two or three years to the year of examination, to execute the examples stated in (a) and (b) :—

- (a) (1) A child's frock (6 to 10 years), a petticoat (bodice and princess style) to be cut out and made entirely by hand.
- (2) A child's overall, cut and embroidered.
- (3) A Magyar bodice, a blouse and a petticoat.
- (4) A shirt.
- (5) A knitted suit for a child (including cap).
- (6) A pair of knitted socks on four needles.
- (7) A patch in a garment made of cotton, silk and flannel.
- (8) Darning, repairing a hole.

(b) A knowledge of the following stitches in embroidery either on samples or on garments, is expected of the candidates :

Kontha, chain, stem, satin, kashmere, fishbone, feather and canvas stitches, French knots, punctured work. Fancy work on net and in *jori*.

A corner suitable for a pillow case; drawn thread and crotchet; Richelieu or Applique.

*N.B.*—The candidate who has executed her examples under the supervision of the teacher must produce a certificate by the teacher to the effect that it has been executed solely and entirely by the pupil herself.

## XX

### (A) MUSIC

*(For Girls only)*

Voice and Ear Training—Simple ear-tests, such as being able to recognise any note of the scale, the keynote being given.

Swara Exercises—Ash and Gamak Sadhan.

Four Bengali or Hindusthani songs in each of the following Raginis :—

Alaiya, Bibhas, Khambaj and Jhinjit.

Time : Tal—Correct beating of the hands.

The singing of the above Raginis in Tetala, Thungri, Ektala and Dadra.

Dandamatric and Akaramatric notation.

Four Bengali or Hindusthani songs in each of the following Raginis :—

Iman Kalyan, Kaphi, Behag and Desh.

Tals :—Jahmptal and Teora.

Elementary theory of Swaras and Raginis learnt.

Simple Tans.

Four Bengali or Hindusthani songs in each of the following Raginis :—

Bhairabi, Chhayanat, Pilu and Bagesri.

Tals :—Chautal and Surphanktal.

Singing at sight simple songs in the Raginis taught in either notation.

Four Bengali or Hindusthani songs in each of the following Ragas and Raginis :—

Bhairab, Purabi, Mallar and Asavari.

Three Kirtans in Jhamptal, Lopha, Teot.

Three Baul songs.

Some lessons in Instrumental Music, e.g., Sitar, Esraj, Violin or Veena, Raginis being the same as in the case of vocal music.

Suitable books on the subject will, from time to time, be recommended by the Syndicate and directions given for the holding of the examination.

(B) ALTERNATIVE SYLLABUS IN  
WESTERN MUSIC

*(For Girls only)*

- A. Questions will be asked on Notations, Scales, Clef, Keys, Intervals, Time, and generally the marks and terms used in Music.
- B. Aural Tests. Candidates will be asked to reproduce, in one pitch, examples of musical rhythms played on the piano ; to write a short phrase from dictations, and to divide it into bars, key and keynote being given ; to recognise diatonic intervals formed by any two notes of the scale, the keynote being sounded ; to recognise common chords and their inversions.
- C. Writing from memory, in any key specified by the Examiner, the melody of one or more of a number of Folk Songs prescribed in advance for study. Other questions may be set on these songs.
- D. (i) To write a melody the rhythm of which will be specified.  
(ii) To add a voice part to a given one.
- E. Instrumental Music (Piano or approved Stringed Instrument) and singing.
  - (i) Studies to be prescribed from time to time.
  - (ii) Reading at sight of simple exercises.

XXI

DRAWING AND PAINTING INCLUDING AN  
APPRECIATION OF FINE ARTS

The course shall consist of a Practical part and a Theoretical one, carrying respectively 40 and 60 marks. Questions on the Practical part will include (a) reproduction to a scale of an outline drawing, (b) memory drawing of one of a number of familiar subjects.

The syllabus for the Practical part shall consist of Black-board Drawing, Free-hand Drawing and Memory Drawing.

The Examination on the Theoretical part shall include simple questions on the appreciation of Painting, Sculpture and Architecture on the lines of the following syllabus :—

**Architecture :** Elements of Architectural Forms. Ground Plan, Elevation, General Principles. Ornamentation; Architectural Sculpture. Analysis of Typical Examples of Asiatic and European Architecture based on the study of a limited number of standard works of Architectural Art, with special emphasis on Indian Architecture.

**Painting :** Elements of Pictorial Forms. Principles of Composition and Design. General Principles of Colour. Elements of Calligraphy. Analysis of Typical examples of Asiatic and European Painting based on the study of a limited number of standard works of Pictorial Art, with special emphasis on Indian Painting.

**Sculpture :** Elements of Sculptural Forms. Figures in the Round. Figure in Relief. Imitation of Natural Forms. Decorative Sculpture. Analysis of Typical examples of Asiatic and European Sculpture based on the study of a limited number of standard works of Sculptural Art with special emphasis on Asiatic Sculpture.

The University will prepare and publish text-books including reproductions of selected masterpieces of Art recommended for study.

For the Practical course the Syndicate shall recommend, from time to time, standard Drawing Books.

### GENERAL

13. In order to pass the Matriculation Examination a candidate must obtain—

(i) 36 per cent. of the total marks in Major Vernacular and in English ;

(ii) 30 per cent. of the total marks in each of the other subjects ;

(iii) 36 per cent. of the total marks in the aggregate of all the compulsory papers.

14. Candidates who obtain 60 per cent. of the marks in the aggregate shall be placed in the First Division, and those who obtain 50 per cent., in the Second Division. Other successful candidates shall be placed in the Third Division. If a candidate has passed in the compulsory subjects and in the aggregate, the marks in excess of 30 obtained by him in any additional subject shall be added to his aggregate, and the aggregate so obtained shall determine his division and his place in the list.



15. Any candidate who has failed in one subject only and by not more than 5 per cent. of the full marks in that subject and has shown merit by gaining First Division marks in the aggregate shall be allowed to pass. In order to determine the division in which such a candidate will be placed and his place in the division, the number of marks by which he has failed in one subject shall be deducted from his aggregate.

16. If the Examination Board is of opinion that, in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate or for any other reason, it shall forward the case to the Syndicate with a definite recommendation and the reasons for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

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## CHAPTER XXXI

### INTERMEDIATE EXAMINATION IN ARTS

1. The Intermediate Examination in Arts shall be held annually in Calcutta and in such other places as shall, from time to time, be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Any under-graduate of the University may be admitted to this examination, provided he has prosecuted a regular course of study in one or more Colleges affiliated for this purpose, for not less than two academical years after passing the Matriculation Examination.

Any student who has passed the Intermediate Examination in Science may take up the course for the Intermediate Examination in Arts at the second year's stage, and, after one year's regular course of study in one or more Colleges affiliated for the purpose, appear at the examination. He will be excused attendance and examination in the subject or subjects in which he has already passed at the Intermediate Examination in Science.

3. Every candidate sent up for the Intermediate Examination in Arts by an affiliated College shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the College periodical examinations and other tests, and (d) of probability of passing the examination. Every candidate for admission shall send in his application with a certificate in the form prescribed by the Syndicate either to the Registrar or to a local officer recognised by the Syndicate. Every such application must reach the office of the Registrar at least six weeks before the date fixed for the commencement of the examination.

4. A fee of thirty rupees shall be forwarded by each candidate with his application. A candidate who fails to pass or to present himself for examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to any one or more subsequent Intermediate Examinations in Arts on payment of a like fee of thirty rupees on each occasion, subject to the provisions of Sections 4B and 4C :

Provided that if a candidate who has passed the Intermediate Examination in Arts or Science and is prosecuting his studies for a higher examination in a College affiliated to this University, is required by the University to appear in a special subject at the Intermediate Examination in Arts, he shall pay a reduced fee of fifteen rupees only.

4A. If a student, after completion of a regular course of study for the examination, does not register himself as a candidate for or present himself at the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied, or from a member of the Senate, testifying to his good character during the intervening period, and provided further that in case the student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other affiliated College or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

If such student does not register himself as a candidate for, or appear at, any of the two examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard on payment of the prescribed fee, provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes a fresh course of study for at least one academical year immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing at the examination under the second paragraph of this section will be deemed to be non-collegiate students.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who having been allowed to appear at the examination as a non-collegiate student on account of shortage of attendance at lectures does not register himself as a candidate for or present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students appearing

under the first and second paragraphs above, will be treated as non-collegiate students.

4B. If a student appears at the examination and fails, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied or, with the permission of the Syndicate, from the Principal of any other College affiliated to the University, that he has passed the test examination held by such a College immediately preceding the examination to which he seeks admission and a certificate either from the Principal of such a College or from a member of the Senate testifying to his good character during the intervening period. Provided further that in case a student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other College or from some other authority approved by the Syndicate to the effect that he has taken a course of practical training during the year immediately preceding the examination at which he presents himself.

Second, third and fourth paragraphs of Section 4A above shall apply to students referred to in this section.

4C. If a candidate is unsuccessful at the examination on account of failure to secure pass marks in one subject only but obtains 40 per cent. of marks in aggregate in other subjects, he may appear for re-examination in that subject alone in which he has failed, on payment of a fee of Rs. 15, at a special supplementary examination, if held by the University, six months after the examination at which he was unsuccessful, or at the next annual examination, but not at both:

Provided that the candidate produces, in addition to the ordinary certificate or certificates required by the Regulations, a certificate from the Principal of the College at which he last studied or from a member of the Senate, testifying to his good character during the intervening period:

Provided further that, in case a student appears for re-examination in a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other College affiliated to the University in that subject or from some other authority approved by the Syndicate, to the effect that he has taken a course of practical training in that subject for a period of not less than three months preceding the examination at which he presents himself.

If the candidate obtains pass marks in the subject at the re-examination, he shall be declared to have passed the examination as a whole.

If such a candidate fails to pass in the subject at the re-examination or fails to appear at any of the examinations mentioned in the first paragraph and seeks admission to any subsequent annual examination of the University, he will be required to appear in all the subjects prescribed for the examination, subject to the provisions of Section 4B above.

5. The Intermediate Examination in Arts shall be conducted by means of printed papers, the same paper being used at every place at which the examination is held.

6. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed, arranged in three divisions, the first in order of merit and the second and third in alphabetical order. Names of candidates who pass the examination under section 4C above shall be published separately, arranged in alphabetical order, without any division or distinction. Every candidate shall, on passing, receive a certificate in the form entered in Appendix A.

7. The subjects for the Intermediate Examination in Arts shall be—

- |  |    |                         |
|--|----|-------------------------|
| (1) English  | .. | .. <i>Three papers.</i> |
| (2) One of the following vernacular languages :—Bengali, Hindi, Uriya, Assamese, Urdu, Burmese, Modern Armenian, Khasi, Nepali, Maithili, Modern Tibetan, Marathi, Gujarathi, Telegu, Tamil, Kanarese, Malayalam, Sinhalese, Portuguese, Manipuri, Sindhi, Panjabi (Gurumukhi), Persian, provided that a candidate may take up the last subject if it is not taken up as a Classical language. | .. | .. <i>One paper.</i>    |

The Syndicate shall have power to add to the list.

If the vernacular of a candidate is a language not included in the above list, he shall have an alternative paper of a somewhat advanced character in English.

- (3), (4) and (5) Three of the following subjects, of which two at least must be from Group A:—

#### GROUP A

- (i) One of the following languages :—

Sanskrit, Pali, Arabic, Persian, Hebrew, Classical Armenian, Greek, Latin, French, German, Italian, Syriac.

Or

One of the following Alternative Vernacular languages :—  
Bengali, Hindi, Assamese, Urdu:

Provided that a student will not be allowed to offer any of these four languages for the Intermediate Examination in Arts unless he has previously passed the Matriculation Examination

in a Classical language or has passed that examination in one such language before his admission to the Intermediate Examination in Arts

Students taking up any of these languages as Alternative Vernacular shall be examined in an Additional Paper in that language in lieu of the paper in Vernacular under 7 (2) above : provided, however, that this will not apply in the case of a student who takes up as Alternative Vernacular a language which is not his own Vernacular.

- (ii) History.
- (iii) Logic.
- (iv) Mathematics.
- (v) Elements of Civics and Economics.
- (vi) Commercial Geography.
- (vii) Commercial Arithmetic and Elements of Book-Keeping.
- (viii) Junior Military Course (This subject may be taken subject to the provision of Chapter LIII-A).

#### GROUP B

- (i) Physics.
- (ii) Chemistry.
- (iii) Geography.
- (iv) Physiology.
- (v) Botany.
- (vi) Zoology.
- (vii) Geology.
- (viii) Anthropology.
- (ix) Biology.
- (x) Psychology.

No candidate shall be allowed to take up Geography under Group B along with Commercial Geography under Group A.

There shall be *two papers* in each of the subjects enumerated under Group A. In each of the subjects under Group B there shall be *two Theoretical papers* and *one Practical paper*.

8. Every paper in every subject shall be of three hours, and shall carry 100 marks, excepting that in any subject under Group B each Theoretical paper shall carry 75 marks and the Practical paper 50 marks, and of these 50 marks 10 marks shall be set apart for laboratory note-books.

8A. Candidates may also be examined, if they so desire, in an additional subject included under Group A, provided they have not already taken the subject. In this optional subject there shall be *two papers* of three hours each.

\*Candidates may also take up Geography as an additional subject in which there shall be two Theoretical papers of 75 marks

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\* [Sanctioned by Government (*vide* Syndicate, dated the 16th December, 1949. item No. 50.)]

each and one Practical paper of 50 marks of which 10 marks shall be set apart for Laboratory note-book, provided that they have not taken up Geography as a compulsory subject under Group B.

9. The Syllabus in Mathematics and in all the subjects in Group B shall be the same as that prescribed for the Intermediate Examination in Science.

10. There shall be a Practical examination in each Science subject, and candidates shall be required to pass in the Practical portion of the subject as well as in the Theoretical portion defined in the Syllabus. Every student who desires to be examined in any such subject must produce a certificate from the Principal of his College to the effect that he has completed in an affiliated College the corresponding Practical course prescribed by the Regulations.

11. The following are definitions of the limits of the above subjects :—

#### ENGLISH

*Paper I.*—Poetry texts.

*Paper II.*—Prose texts

*Paper III.*—(a) Essay, (b) Prosody and Rhetoric, (c) Questions on unseen passages from books of the same standard of difficulty as those recommended for the Matriculation Examination—

(a)	shall carry	40	marks.
(b)	„ „	20	„
(c)	„ „	40	„

#### VERNACULARS

1. The course in Vernacular shall include select texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies concerned.

The Syndicate shall also draw up, on the recommendation of the Board, a small selection of books by notable authors as showing the standard up to which students will be expected to have read.

2. The examination shall include :—

(a)	Questions on the subject-matter and on the language of the prescribed texts	..	40	marks.
(b)	An unseen passage to be summarised or amplified in the Vernacular	..	15	marks.
(c)	Translation from English into Vernacular	..	15	marks.
(d)	Questions on Composition	..	10	marks.
(e)	An Essay in Vernacular—headings being given	..	20	marks.

3. (a) The unseen passage shall not exceed in difficulty the Vernacular texts prescribed for the examination.

(b) Questions shall not be set on the history of language or literature of the Vernacular.

4. The Alternative Paper in English (for candidates whose Vernacular is a language not included in the prescribed list) shall include :

(a) Questions on selected texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies in English, and

(b) Questions on composition, including Rhetoric and Prosody.

### ADDITIONAL PAPER IN ALTERNATIVE VERNACULAR LANGUAGE

A candidate who takes up Bengali, Assamese, Urdu or Hindi as an Alternative Vernacular, under Group A (i) under Section 7, Sub-sections (3), (4) and (5), will be examined in an Additional Paper in that language in lieu of the paper in Vernacular under Sub-section 2 of Section 7. The marks in that paper shall be distributed as follows :—

History of literature of the Vernacular ..	50 marks.
• Translation from English into Vernacular ..	15 marks.
Composition ..	15 marks.
Grammar ..	20 marks.

### SANSKRIT

1. The course in Sanskrit shall consist of selected passages in prose and verse. The texts in poetry shall include a portion of the Bhattikavya, and a portion either of the Raghuvansa or of the Kumar-Sambhava. The text in prose shall be taken from the Dasakumaracharita and the Mahabharata.

To the above list, other works\* may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies in Sanskrit.

2. The course shall also include the elements of Sanskrit Grammar, of which a fuller knowledge shall be required than at the Matriculation Examination. A text-book in Grammar shall be prepared and prescribed by the University and be its property.

3. The marks shall be distributed as follows :—

#### *Paper I.*

(a) Questions on the Poetry texts. Not more than 25 marks shall be assigned to mere translation from the set texts .. 50 marks.

\* The following works have been added by the Syndicate on the recommendation of the Board of Studies in Sanskrit :—

Vasavadatta, Kadambari, Harshacharita, Kathasaritsagara, Balacharita and Bhagavadgita.



- |   |    |           |
|---|----|-----------|
| (b) Questions on Grammar, including passages for correction | .. | 25 marks. |
| (c) Passages for translation from English into Sanskrit     | .. | 25 marks. |

*Paper II.*

- |   |    |           |
|---|----|-----------|
| (a) Questions on the Prose texts. Not more than 15 marks shall be assigned to mere translation from the set texts | .. | 30 marks. |
| (b) Unseen Sanskrit passages for translation into English   | .. | 30 marks. |
| (c) Questions on Grammar  | .. | 15 marks. |
| (d) Passages for translation from English into Sanskrit   | .. | 25 marks. |

Questions on the texts shall comprise—

- (a) Passages from the set texts for translation into English,
- (b) Questions on the subject-matter of the text,
- (c) Questions on the language of the text and grammatical questions relating thereto, and
- (d) Passages for translation into English from such standard Sanskrit commentaries on the set texts as may be prescribed from time to time.

4. Unseen passages shall consist of simple prose not exceeding in difficulty the Prose texts set for the Matriculation Examination.

No questions shall be set on Prosody or Rhetoric.

## PALI

1. The course in Pali shall consist of such pieces in prose and poetry as may be prescribed by the Syndicate, on the recommendation of the Board of Studies concerned, from the following works :—

- (a) Digha Nikaya.
- (b) Khuddaka Nikaya.
- (c) Milindapanha.
- (d) Mahavamsa.

The Selections should be such as to afford an elementary knowledge of the Doctrines and History of Buddhism.

To the above list other works may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies concerned.

2. The course shall also include a knowledge of Pali Grammar of a higher standard than that required at the Matriculation Examination.

Grammars shall be recommended from time to time by the Board of Studies concerned.

3. The marks shall be distributed as follows :—

*Paper I.*

- |   |           |
|---|-----------|
| (a) Questions on the Poetry texts. Not more than 25 marks shall be assigned to mere translation from the set texts .. | 50 marks. |
| (b) Grammatical questions ..  | 25 marks. |
| (c) Passages for translation from English into Pali ..  | 25 marks. |

*Paper II.*

- |  |           |
|--|-----------|
| (a) Questions on the Prose texts. Not more than 25 marks shall be assigned to mere translation from the set texts .. | 50 marks. |
| (b) Unseen Pali passages for translation into English ..   | 30 marks. |
| (c) Grammatical questions ..   | 20 marks. |

Questions on the texts shall comprise—

- |   |
|---|
| (a) Passages from the set texts for translation into English, |
| (b) Questions on the subject-matter, and                      |
| (c) Questions on the language of the text.                    |

Unseen passages shall consist of simple prose not exceeding in difficulty the texts set for the Matriculation Examination.

## ARABIC

1. The course in Arabic shall include easy pieces in poetry and prose, the latter in the form of tales, anecdotes, biographical and historical narratives, accounts of travels and didactic stories selected from any or all of the following works in classical and modern Arabic :—

### *Prose*

*Literature :*

Qur'an.

Mishkat-al-Masabih (passages of a non-contentious nature to\* be chosen).

al-Munabbihat, by Ibn al-Hajar.

Kalila wa Dimna.

Ikhwan al-Sifa.

Nihayat al-Arab.

Kitab al-Mahasin wa al-Masawi, by al-Baihaqi.

Majani al-Adab (Pts. III-IV).

*History, Biography :*

al-Kamil, by Ibn al-Athir.

Wafayat al-A'yan, by Ibn Khalikan.

*Travels :*

Tuhfat an Nuzzar, by Ibn Battutah.

*Modern Literature :*

Bahr al-Adab (Pts. III-IV ; Published : Alexandria).

*Poetry*

Diwan of Hassan b. Thabit.

Diwan of Abu al-Atahiyah.

Diwan of Ibn Zaydum.

Diwan of ar-Rasafi.

Qasidat al-Burdah, by al-Busiri.

Qasa'id of al-Farazdaq.

Majani al-Adab (Poetical passages).

Mahr al-Adab.

To the above list other works may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies in Arabic, Persian and Urdu.

The selections shall be prepared by and be the property of the University.

2. The course shall also include Arabic Grammar, of which a fuller knowledge shall be required than at the Matriculation Examination.

A text-book in Grammar shall be prepared and prescribed by the University and be its property.

The Board of Studies concerned may make such modification in the list of books as may seem to them desirable.

The scope of the subject of each paper shall from time to time be defined by the Board concerned and the distribution of the marks may be modified in such manner as may seem desirable to the Board.

3. The marks shall be distributed as follows :—

*Paper I.*

(a) Questions on the texts .. 50 marks.

Not more than 25 marks shall be assigned to mere translation.

(b) Grammar, including passages for correction and unvocalised passages for vocalisation .. 30 marks.

(c) Simple English passages for translation into Arabic .. 20 marks.

*Paper II.*

(a) Questions on the texts .. 30 marks.

Not more than 15 marks shall be assigned to mere translation.

- (b) Unseen passages of Arabic for translation into English .. .. 30 marks.  
 (c) Questions on Grammar .. .. 15 marks.  
 (d) Simple English passages for translation into Arabic .. .. 25 marks.

The passages for translation from English into Arabic shall in no case be translated portions of the prescribed texts.

Questions on the texts shall comprise—

- (a) Passages from the set texts into English,  
 (b) Questions on the subject-matter, and  
 (c) Questions on the language of the text.

The unseen passages shall consist of simple prose not exceeding in difficulty the text set for the Matriculation Examination.

No questions shall be set on Prosody or Rhetoric.

## PERSIAN

1. The course in Persian shall include easy pieces in Poetry and Prose the latter in form of tales, anecdotes, biographical and historical narratives, accounts of travels and didactic stories, selected from any or all of the following works in Classical or Modern Persian :—

### *Prose*

#### *Literature :*

Kalila wa Dimna, by Nasrullah

#### *Ethics :*

Akhlaq-i-Muhsini, by M. Hussain al-Wai'z.

#### *History, Historical Geography :*

Tarikh-i Sasaniyan.

Fars-nama by Ibn al-Balkhi.

Half-Iqlin, by Amin Ahmad Razi.

Riyaz- as Salatin, by Ghulam Husain Salim.

#### *Stories :*

Nigaristan, by Qazi Ahmad Ghaffari.

#### *Letters :*

Ruqa 'at-i-' Alamgir.

#### *Modern Persian :*

Tarikh-i Adabiyat-i Iran, by Dr. Riza Zada Shafaq.

*Poetry**Mathnawi:*

Sikandar-nama, of Nizami.  
 Majnun-Laylah, of Khusrau.  
 Yusuf wa Zulaikha, of Jami.  
 'Ibrat-Afza, of 'Ubaidi.

*Qasideh :*

Qasa'id-i Sa'di.  
 Qasa'id-i Salman Sawaji.

*Ghazal :*

Ghazaliyyati-i Khusrau.  
 Ghazaliyyati-i Jami.  
 Ghazaliyyati-i 'Ali Hazin.

*Ruba'i :*

Ruba'iiyat-i 'Umar-i-Khayyam.  
 Ruba'iiyat-i Sahabi.

*Modern Persian :*

Sukhanwaran-i Iran dar' Asr-i.  
 Hazir (Poetical Selections only). by Md. Ishaque.

To the above list other works may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies in Arabic, Persian and Urdu.

The selections shall be prescribed and prepared by the University and be its property.

2. The course shall include Persian Grammar.

The Board of Studies concerned may make such modification in the list of books as may seem to them desirable.

The scope of the subject of each paper shall, from time to time, be defined by the Board concerned and the distribution of the marks may be modified in such manner as may seem desirable to the Board.

3. The marks shall be distributed as follows :—

*Paper I.*

- |   |    |           |
|---|----|-----------|
| (a) Questions on Persian Poetry Texts                             | .. | 50 marks. |
| Not more than 25 marks shall be assigned to mere translation.     |    |           |
| (b) Persian Grammar   | .. | 25 marks. |
| (c) Passages of simple English Prose for translation into Persian | .. | 25 marks. |

In (b) passages shall be set for testing the practical application of grammatical rules.

*Paper II.*

(a) Questions on Persian Prose Texts .. .. 40 marks.  
Not more than 20 marks shall be assigned to mere translation.

(b) Unseen passages for translation from Persian into English .. .. 35 marks.

(c) Passages of simple English Prose for translation into Persian .. .. 25 marks.

The passages for translation from English into Persian shall in no case be translated portions of the prescribed texts.

Questions on Persian texts shall comprise—

(a) Passages from the set texts for translation into English,

(b) Questions on the subject-matter, and

(c) Questions on the language of the text.

The unseen Persian passages shall consist of easy prose and verse not exceeding in difficulty the text prescribed for the Matriculation Examination.

No questions shall be set on Prosody or Rhetoric.

## ARMENIAN

1. The course in Classical Armenian shall consist of—

*Prose*

Moses of Khoren's History of Armenia, Part II.

*Poetry*

Elishe Vardapiet Doorian's Course of Classical Armenian, Part II.

The course shall also include Armenian Grammar of which a fuller knowledge will be required than at the Matriculation Examination.

2. The marks shall be distributed as follows :—

*Paper I.*

(a) Questions on the Prose Texts .. .. 40 marks.  
Not more than 20 marks shall be assigned to mere translation.

(b) Questions on Grammar, including passages containing errors for correction .. .. 20 marks.

(c) Passages for translation from English into Armenian. .. 40 marks.

*Paper II.*

(a) Questions on the Poetry Texts .. .. 40 marks.  
Not more than 20 marks shall be assigned to mere translation.

- (b) Unseen passages in Armenian for translation into English .. 30 marks.
- (c) Passages for translation from English into Armenian. .. 30 marks.

Questions on the texts shall comprise—

- (a) Passages from the set texts for translation into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the language of the text.

The unseen passages shall consist of simple prose not exceeding in difficulty the text prescribed for the Matriculation Examination.

### HEBREW

The course in Hebrew shall consist of prescribed selections from Genesis, Isaiah, Ruth and the Psalms.

The marks in the two papers shall be distributed in the same proportions as in the case of Armenian.

### GREEK

1. The course in Greek shall consist of suitable selections from the following prose writers and poets, to be prescribed from time to time, by the Board of Studies concerned :—

Xenophon, Herodotus, Plato, Plutarch, Homer, Euripides and Sophocles.

The course shall also include Attic Greek Grammar.

2. The marks shall be distributed as follows :—

#### *Paper I.*

- (a) Questions on the Prose Selections .. 40 marks.

Not more than 20 marks shall be assigned to mere translation.

- (b) Questions on the Poetry Selections .. 40 marks.

Not more than 20 marks shall be assigned to mere translation.

- (c) Questions on Grammar .. .. 20 marks.

#### *Paper II.*

- (a) Translation of simple passages from English into Greek .. .. 30 marks.

- (b) Unseen passages in Greek for translation into English .. .. 70 marks.

Questions on the texts shall comprise—

- (a) Passages from the set texts for translation into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the language of the text.

The unseen passages shall not exceed in difficulty the selections set for the Matriculation Examination.

## LATIN

1. The course in Latin shall consist of suitable selections from the following prose writers and poets, to be prescribed from time to time, by the Board of Studies concerned :—

Sallust, Cicero, Livy, Virgil, Horace.

The course shall also include Latin Grammar.

2. The marks shall be distributed as follows :—

*Paper I*

(a) Questions on the Prose Selections . . . . . 40 marks

(b) Questions on the Poetry Selections . . . . . 40 marks

In neither case shall mere translation of the set texts carry more than 20 marks

(c) Questions on Grammar . . . . . 20 marks

*Paper II*

(a) Translation of simple passages from English into Latin . . . . . 40 marks

(b) Unseen passages in Latin for translation into English . . . . . 60 marks

Questions on the texts shall comprise—

(a) Passages from the set texts for translation into English,

(b) Questions on the subject-matter, and

(c) Questions on the language of the text.

The unseen passages shall not exceed in difficulty the selections set for the Matriculation Examination.

## FRENCH

1 The course in French shall consist of one work in prose and selections in verse from one or more writers, which shall be prescribed from time to time, by the Board of Studies concerned .

The course shall include French Grammar.

2. The marks shall be distributed as follows :—

*Paper I*

(a) Questions on the prescribed texts, prose and verse . . . . . 50 marks

Not more than 25 marks shall be assigned to mere translation

(b) Questions on Grammar . . . . . 20 marks

(c) Passages for translation from English into French . . . . . 30 marks

*Paper II*

(a) Unseen passages of French prose and verse for translation into English . . . . . 70 marks



- (b) Passages for translation from English into French .. 30 marks

Questions on the texts shall comprise—

- (a) Passages from the set texts for translation into English,  
 (b) Questions on the subject-matter, and  
 (c) Questions on the language of the text.

### GERMAN

1. The course in German shall consist of one work in prose and selections in verse from one or more writers, which shall be prescribed from time to time, by the Board of Studies concerned.

The course shall include German Grammar.

2. The marks in the two papers shall be distributed in the same proportions as in the case of French.

### ITALIAN

1. The course in Italian shall consist of three works in prose and selections in verse from one or more writers, which shall be prescribed from time to time, by the Board of Studies concerned.

The course shall include Italian Grammar.

2. The marks shall be distributed as follows :—

#### *Paper I.*

- (a) Questions on the prescribed texts, prose and verse .. 50 marks  
 Not more than 25 marks shall be assigned to mere translation.  
 (b) Questions on grammar .. 20 marks  
 (c) Passages for translation from English into Italian .. 30 marks

#### *Paper II.*

- (a) Unseen passages of Italian prose and verse for translation into English .. 70 marks  
 (b) Passages for translation from English into Italian .. 30 marks

Questions on the text shall comprise—

- (1) Passages from the set texts for translation into English,  
 (2) Questions on the subject-matter, and  
 (3) Questions on the language of the text.

### ALTERNATIVE VERNACULAR

The distribution of papers and marks in the Alternative Vernacular shall be as follows :—

*Paper I—Poetry Text* .. .. 65 marks

Rhetoric and Prosody	..	..	20 marks
• Unseen	..	..	15 „
<i>Paper II</i> —Prose Text	..	..	65 „
Essay	..	..	20 „
Unseen	..	..	15 „

### HISTORY

The subject shall be—

(i) The History of England, from the earliest times to the present times.

(ii) The History of Ancient Greece, from the earliest times to the Roman Conquest, 146 B.C.

(iii) The History of Rome, from the earliest times to the extinction of the Western Empire, 476 A.D.

(iv) A special period of the History of Hindu Colonial Expansion.

(v) A special period of the History of Islam outside India.

*Paper I.*—History of England.

*Paper II.*—History of Greece and Rome.

*Or*

A special period of the History of Hindu Colonial Expansion and a special period of the History of Islam outside India.

The periods to be studied in the subject or subjects included under *each* paper may be changed by the Syndicate from time to time on the recommendation of the Board of Studies concerned.

### LOGIC

Definition, Scope and Use of Logic. Its relation to Metaphysics and Psychology. Immediate and Mediate knowledge. Reasoning in general. Division of Logic into Formal and Material. Formal Logic. Principles of Formal Reasoning : Identity, Contradiction, Sufficient Reason. Axioms and Postulates. Language and Thought. Realism, Conceptualism and Nominalism, and their bearing on the nature of the logical processes.

Concept and Term. Abstraction. Use of names. Denotation and Connotation. Extension and Intension. Distribution. Definition, with its limits and formal conditions. Logical Division and its conditions. Various Divisions of Terms and their significance.

Judgment and the Proposition. Theory of Predication and Import of Propositions. Essence. Genus. Species. Differential Property. Accident. Quantity and Quality. Modality. Simplification of Propositions. Various Divisions of Propositions and their significance. Opposition of propositions, and its practical applications.

Inference in general. Immediate and Mediate Inference. Deductive and Inductive Inference.

Immediate Inference, and its different forms. Conversion, Obversion, Contraposition, Inversion, Opposition with their practical applications.

Deductive Inference. Premises and Middle Terms. Syllogism : its structure and condition. The canons. Figures and Moods, and their rules. Reductions. Hypothetical and Disjunctive Syllogism with their rules. Dilemma. Compound Syllogism and Trains of Reasoning. Practical application of the Syllogism to express and test reasoning.

Fallacies in Deductive Reasoning.

Material Logic. Nature of truth. Knowledge and Reality. Sources of Knowledge. Perception. Inference. Authority. Necessary Truth.

Generalization and the General Idea.

Science. Laws of Nature. Uniformity of Nature.

The grounds and conditions of Inductive Inference. Causality. Origin of belief in universal causations. Energy and conservation. Causes and conditions. Plurality of Causes. Composition of Causes, and Intermixture of Effects.

Discovery and Proof. Hypotheses, their uses and conditions. Theory. Verification. Observation and Experiment and their uses. The Experimental methods and their use, with examples of their application. Fallacies of Observation.

Nature, place and use of the Inductive Method. Perfect and Imperfect, Complete and Incomplete Induction. Inference from Analogy. Inference from simple Enumeration. Inductive Probability ; Chance and its Elimination. Scientific Induction. Processes simulating Induction. Fallacies in Inductive Reasoning.

Classification, Natural and Artificial, and its conditions. Relation of Classification to Division. Definition, and its material conditions. Description. Type. Errors in Classification and Definition. Terminology and Nomenclature.

Nature, place and use of the Deductive Method. Relation of Induction and Deduction ; Nature, function and value of the Syllogism. Inductive and Deductive Sciences. The actual Method of Scientific Progress. Demonstration. The World as a system of law. Explanation, and its limits.

## ELEMENTS OF CIVICS AND ECONOMICS

### *First Paper*

#### (a) Principles of Civics

The Individual and Society.

The Family, Clan, Tribe, People and Nation.

The Modern State. The Citizen as a member of the State.  
 Activities of the State.  
 Law and Liberty.  
 Modern Forms of Government.  
 Merits and Defects of Democracy.  
 Public Opinion : Political Parties.  
 Organs of Government —Legislative, Executive, Judicial.  
 Separation of Functions.  
 Organisation of the Legislature—Executive and Judiciary.  
 Electorate—Its extent and nature.  
 Local Government—Its categories.  
 Citizenship : Rights and Duties : Civic ideals.  
 Nationalism : The League of Nations.

(b) Elements of Indian Administration

A brief historical background.  
 The Secretary of State for India—His duties and powers.  
 Advisors of the Secretary of State.  
 The Governor-General—His duties and powers.  
 The Federal Executive—Its Composition and Functions.  
 The Federal Legislature—Its Composition and Functions.  
 Central subjects.  
 Indian States—Their Status.  
 Provincial Governments—The Governors—The Provincial  
 Executive—Its composition and functions—Provincial subjects  
 —Provincial Legislatures.  
 The District Administration.  
 The Judicial System.  
 The Services.  
 Revenue and expenditure of the Central Government and  
 the Provincial Governments.  
 Local Self-Government—Municipalities, District Boards.  
 Local or Taluq Boards ; Union Boards or Panchayet committees;  
 Constitution and functions; Sources of Revenue and Heads of  
 Expenditure.

*Second Paper*

(a) Elementary Principles of Economics

The Economic Activities of Man—Subject-Matter of Economics—Fundamental Concepts—Wealth, Goods, Utility, Value and Price, Demand and Supply.  
 Consumption—Human wants and their satisfaction.  
 The Law of Diminishing Utility.  
 Total and Marginal Utility.

**Production—Factors :** Land, Labour, Capital, Organisation ; Land and the influences affecting its productivity ; Labour ; its efficiency ; Division of Labour ; Capital—The different forms.

Business ability and enterprise in relation to production. Large-scale and small-scale production, localization of Industry, Laws of Diminishing, Constant and Increasing Returns.

Exchange—Barter, Money, Standard and Token Money, Paper Money, Prices.

Functions of a Bank : Credit Instruments.

Foreign Trade : Protection and Free Trade.

Distribution—Rent, Wage, Interest, Profit.

Public Finance—Revenue and Expenditure, Taxation, its main principles : Direct and Indirect Taxes ; Public Debt.

### (b) Indian Economics

The natural environment—The geographical situation.

Natural Divisions—Climate. The Monsoons, Soils, Mineral Resources.

The Social Structure—Total population, Density, Towns and Villages, Health, Birth rate, Death rate, Migration, the Caste System, the Joint Family.

Production—Agriculture—Special condition of Land ; Agricultural indebtedness.

The Co-operative System : Irrigation : Land Settlements. The harvests ; Chief Crops ; Causes of the backwardness of Indian Agriculture ; Fruit Growing ; Sericulture ; Arboriculture ; Mineral Production. Manufactures, small-scale and large-scale industries. Labour conditions in Agriculture and in Industry.

Distribution—Conditions determining rent. Cash rents and Corn rents ; Wages, nominal and real. Interest and profits.

Exchange—Inland Trade and Transport ; Railways ; Roads ; Waterways ; Aviation ; Foreign commerce ; Imports ; Exports—Trade with principal countries ; Shipping ; The balance of Trade, Free Trade and Protection. Imperial Preference.

Currency and Banking—A descriptive outline of the present currency system of India. Different types of Banks.

Consumption—Wants and activities. The Standard of Life. Effects of consumption on production.

Economic Activities of the State—State and Agriculture, State and Industry, Famines—relief and prevention, Revenue and Expenditure, Taxation, Public debt.

### COMMERCIAL GEOGRAPHY

Students of Commercial Geography will be expected to possess a knowledge of General Geography up to the Matricula-

tion standard. The course in Commercial Geography shall be divided into two papers—one paper to be devoted to countries other than India and the other exclusively to India.

*General Economic Geography* :—The bases of Commercial Geography. Its relation to other Sciences. Trade winds and ocean currents. The Geographical distribution of commercial products. Physical conditions affecting their production. Commodities dependent on climate. Monsoons. Agricultural Products. Forests and fisheries. Mineral products. Manufactures.

*Regional Economic Geography* :—Trade routes. Means of transport and communication. Ports and harbours. Industrial town and commercial centres. Chief products of important countries—agricultural, mineral and manufactured. Principal imports and exports.

*India* :—Detailed study of physical features—Climate, Monsoons—Soils and soil erosion—Location of chief agricultural, industrial and mineral products—Movements of trade, internal and foreign—Transport and communications. Competition between waterways and land transport. Ports and harbours.

## COMMERCIAL ARITHMETIC AND ELEMENTS OF BOOK-KEEPING

### *Commercial Arithmetic*

#### 1. Principles of Arithmetic. Commercial Arithmetic.

- (a) Arithmetical Operations.
- (b) Integers—Fractions : Vulgar and Decimal.
- (c) Contracted Methods of Multiplication, Division and Square root—Decimalisation of money—Calculation of cost.
- (d) Ratio—Proportion—Proportional parts—Percentage—Averages and Statistics.
- (e) Simple Mensuration—Squares, Rectangles, Triangles and Rectilineal figures—Circles, Segments, Sectors—Prisms, Cylinders—Pyramid—Cones—Spheres—Simple Equations and their application to Inverse Problems. Application to Inverse Problems.
- (f) Indian, British and Metric Systems of Weights and Measures.
- (g) Logarithms and their applications.
- (h) Mixtures—Profit and Loss.

#### II. Trade.

##### (a) Inland Trade—

- (1) Invoices and Bills.
- (2) Payment for Goods.

(3) Percentage—Gains and Losses.

(4) Partnerships—Bankruptcies.

(b) Import Trade—

(1) Importing Operation.

(2) Expenses incurred.

(3) Customs and Excise.

(c) Export Trade—

(1) Methods of Exporting Goods.

(2) Kinds of Invoices and their Preparation.

(3) Foreign Weights and Measures.

(4) Tables of Equivalents and Values.

(5) Foreign Currency.

### III. Finance.

(a) Coinage Systems—

(1) Mint Par of Exchange.

(2) Specie Point.

(b) Banking and Exchange—

(1) Payments through Post Office, the Treasury and the Banks.

(2) Bills of Exchange—Telegraphic Transfers—Promissory Notes.

(3) Discount—True, Banker's Commercial—Discounting and Retiring of Bills.

(4) Function of a Bill of Exchange.

(5) Foreign Exchanges—Course of Exchange.

(6) Current Accounts.

(c) Stock Exchange—

(1) Stock Exchange Transactions—Stocks and Shares.

(2) Contango and Backwardation.

(3) Speculation.

(4) London Stock Exchange—Calcutta Stock Exchange.

(d) Annuities—

(1) Interest, Simple and Compound.

(2) Discount, Present Worth and Amount.

(3) Commission and Brokerage.

(4) Kinds of Annuities.

(5) Amount and Present Value of an Annuity.

(6) Leases and Sinking Funds.

(7) Life Annuities.

*Elements of Book-keeping*

1. Book-keeping—Its Principles.
  - (a) Double Entry—Its theory, scientific methods, adaptability to all classes of commercial transactions.
  - (b) Single Entry—Its meaning, principles and defects.
2. Books of Accounts—
  - (a) Journal.
  - (b) Ledger.
  - (c) Cash Book (with or without Bank and Discount columns).
  - (d) Bought, Sold and Bill Books.
3. Methods of Book-keeping—
  - (a) Journalising.
  - (b) Posting.
4. Preparation of Accounts and Balance Sheet—
  - (a) Trial Balance.
  - (b) Journalising adjustment—Depreciation. Bad Debts, Outstanding Incomes and Expenses. Expenses in Advance, Writing off, Fictitious Assets, and creating Reserve Accounts.
  - (c) Journalising Closing Entries.
  - (d) Closing the Ledger.
  - (e) Preparation of Manufacturing Account, Trading Account, Profit and Loss Account. Profit and Loss Appropriation Account.
  - (f) Preparation of the Balance Sheet.
5. Distinction between Receipts and Payments, Account and Revenue Accounts, items of Receipts and Payments and items of Income and Expenditure on the one hand, and of Assets and Liabilities on the other.
6. Treatment of Transactions connected with—
  - (a) Bills of Exchange and Promissory Notes.
  - (b) Goodwill.
  - (c) Consignments, outwards and inwards.
7. Partnerships Accounts (with the exception of dissolution or winding up of a partnership business)—Properitors' Current account.
8. Company Accounts (without the use of the Private Ledger)—
  - (a) Formation of Joint-Stock Companies—Difference between a firm and a Joint-Stock Company—Difference between a Joint-Stock Company with Limited Liability and one with Unlimited Liability—Difference



between a Public Limited Company and a Private Limited Company—Memorandum and Articles of Association, and Prospectus.

(b) Statistical Books which a Joint-Stock Company must keep in order to comply with the requirements of the Indian Companies Act.

(c) Entries relating to Shares—

(1) Application, Allotment and Calls.

(2) Forfeited Shares.

(3) Transfer of Shares.

(d) Preparation of Accounts and Balance Sheet, with easy adjustments.

9. Explanation of the following Commercial Terms—Account, Debtor, Creditor, Debit, Credit, Balance, Gross and Net Profit, Interest, Discount, Asset, Liability, Capital Trial Balance, Balance Sheet, Solvent, Insolvent, Composition, Bad Debts, Posting Folio, Petty Cash, Cheque, Bill of Exchange, Accepting, Honouring, Dishonouring, Discounting, Noting, Retiring, Invoice Receipt Voucher, Debit Voucher, Debit Note, Credit Note, Rebate, Commission, Account Sales, Depreciation, Premium, Provision, Charges, Brokerage, Bill of Sale, Personal Account, Impersonal Account, Real Account, Nominal Account.

## GENERAL

1. In order to pass the Intermediate Examination in Arts a candidate must obtain—

In English .. 108 marks.

In the Vernacular or the Alternative Paper in English .. 36 marks.

In each of the subjects taken up under Group B of Section 7 (3) (4) and (5) :—

In the two theoretical papers .. 40 marks.

In the practical paper .. 20 marks.

In each of the remaining compulsory subjects taken up .. 60 marks.

And in the aggregate .. 340 marks.

2. In order to be placed in the first division a candidate must obtain 500 marks.

In order to be placed in the second division, 400 marks.

The names of candidates placed in the first division shall be published in order of merit.

If a candidate has passed in the compulsory subjects and in the aggregate, the marks in excess of 60 obtained by him in the optional subject, if any, shall be added to his aggregate and the

aggregate so obtained shall determine his division and his place in the list.

3. Any candidate who has failed in one subject only, and by not more than 5 per cent. of the full marks in that subject, and has shown merit by gaining 500 in the aggregate, shall be allowed to pass. In order to determine the division in which such a candidate will be placed and his place in the division, the number of marks by which he has failed in one subject shall be deducted from his aggregate.

4. If the Examination Board is of opinion that, in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reasons for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

5. Candidates who, after passing the Intermediate Examination in Science, appear for the Intermediate in Arts, shall be required, in order to pass, to obtain 36 per cent. in each subject for which they present themselves in the latter examination, provided that in a Science subject they must obtain pass marks both in the theoretical papers and in the practical paper.

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## CHAPTER XXXII

### BACHELOR OF ARTS

1. An examination for the degree of Bachelor of Arts shall be held annually in Calcutta, and at such other places as shall from time to time be appointed by the Syndicate, and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any undergraduate of the University may be admitted to the examination provided he has prosecuted a regular course of study for not less than two academical years after passing the Intermediate Examination in Arts or Science in a College or Colleges affiliated to the University in the subjects which the candidate takes up.

3. Every candidate sent up for the B.A. Examination by an affiliated College shall produce a certificate (*a*) of good conduct, (*b*) of diligent study, (*c*) of having satisfactorily passed the College periodical examinations and other tests, and (*d*) of probability of passing the examination. Every candidate shall send to the Registrar his application, with a certificate in the form prescribed by the Syndicate at least six weeks before the date fixed for the commencement of the Examination. If he desires to be examined for Honours in any subject, he shall name the subject in his application. If a candidate offers himself for examination in Hebrew, Armenian, French or German, he shall be required to give the Registrar notice of the fact twelve months before the date of the examination.

4. A fee of Rs. 45 shall be forwarded by each candidate with his application, provided that a candidate who applies for admission to the Honours Examination shall pay an additional fee of Rs. 10.

A candidate who fails to pass, or to present himself for examinations shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to one or more subsequent Examinations for the Degree of Bachelor of Arts on payment of a like fee of Rs. 45, or Rs. 55 as the case may be, on each occasion, subject to the provisions of Sections 4B and 4C :

Provided that if a candidate who has passed the B.A. or the B.Sc. Examination and is prosecuting his studies for a higher examination or other examination in a College affiliated to this University or in the University Post-Graduate Classes, is required by the University to appear in a special subject at the B.A. Examination, he shall pay a reduced fee of Rs. 23 for the

Pass Course and Rs. 28 for the Honours Course, as the case may be.

4A. If a student, after completion of a regular course of study for the examination, does not register himself as a candidate for or present himself at the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied, or from a member of the Senate, testifying to his good character during the intervening period, and provided further that in case the student offers a Science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other affiliated College or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself :

Provided also that no student will be allowed to take up Honours Course unless he has re-attended lectures (theoretical and whenever necessary also practical) in the Honours subject in accordance with the provisions of Section 6 of Chapter XXVI of the Regulations.

If such student does not register himself as a candidate for, or appear at, any of the two examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, on payment of the prescribed fee, provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes a fresh course of study for at least one academical year immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing at the examination under the second paragraph of this Section will be deemed to be non-collegiate students.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who having been allowed to appear at the examination as a non-collegiate student on account of shortage of attendance at lectures does not register himself as a candidate for or present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students appearing under the first and second paragraphs above will be treated as non-collegiate students.

4B. If a student appears at the examination and fails, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied or with the permission of the Syndicate, from the Principal of any other College affiliated to the University, that he has passed the Test examination held by such a College immediately preceding the examination to which he seeks admission and a certificate either from the Principal of such a College or from a Member of the Senate testifying to his good character during the intervening period: Provided further that in case a student offers a Science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other College or from some other authority approved by the Syndicate to the effect that he has taken a course of practical training during the year immediately preceding the examination at which he presents himself. Provided also that no student who has been unsuccessful at the examination in an Honours subject will be allowed to take up Honours course unless he prosecutes a regular course of study for one academical year immediately preceding his admission to the examination in the Honours subject.

Second, third and fourth paragraphs of Section 4A above should apply to students referred to in the above paragraph.

4C. If a candidate is unsuccessful at the examination on account of failure to secure pass marks in one subject only but obtains 40 per cent. of marks in aggregate in other subjects, he may appear for re-examination in that subject alone in which he has failed, on payment of a fee of Rs. 23, at a special supplementary examination, if held by the University, six months after the examination at which he was unsuccessful, or at the next annual examination, but not at both :

Provided that the candidate produces, in addition to the ordinary certificate or certificates required by the Regulations, a certificate from the Principal of the College at which he last

studied or from a member of the Senate, testifying to his good character during the intervening period :

Provided further that, in case a student appears for re-examination in a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said college or of any other College affiliated to the University in that subject or from some other authority approved by the Syndicate, to the effect that he has taken a course of practical training in that subject for a period of not less than three months preceding the examination at which he presents himself :

Provided also that no student, who has been unsuccessful at the examination in an Honours subject, shall be allowed to appear for re-examination in the Honours Course in that subject.

If the candidate obtains pass marks in the subject at the re-examination, he shall be declared to have passed the examination as a whole.

If such a candidate fails to pass in the subject at the re-examination or fails to appear at any of the examinations mentioned in the first paragraph and seeks admission to any subsequent annual examination of the University, he will be required to appear in all the subjects prescribed for the examination, subject to the provisions of Section 4B above.

5. The examination for the degree of Bachelor of Arts shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

6. Every candidate shall be examined in the following subjects :—

(1) English.

(2) One of the following Vernaculars :—Bengali, Hindi, Uriya, Assamese, Burmese, Urdu, Modern Armenian, Nepali, Maithili, Modern Tibetan, Khasi, Marathi, Gujrathi, Telugu, Tamil, Kanarese, Malayalam, Sinhalese, Sindhi, Portuguese, Manipuri.

The Syndicate shall have power to add to this list.

For candidates whose vernacular is English or an Indian vernacular not included in this list, there shall be an advanced paper in English which shall be treated as separate from the Examination in English.

(3) and (4) Two of the following subjects, one of which at least must belong to Group A :—

#### A

(I) One of the following languages :—Sanskrit, Pali (including a knowledge of Sanskrit up to the Matriculation standard), Arabic, Persian (including a knowledge of Arabic up to the Intermediate standard for Honours

Course only), Hebrew, Classical Armenian, Greek, Latin, French, German, Italian, Syriac, or one of the following Vernaculars (Pass or Honours)—Bengali, Assamese, Urdu or Hindi.

(II) History.

(IIA) Indo-Islamic and World History.

(IIB) Islamic History and Culture.

(IIC) Ancient Indian and World History.

[Each of the subjects (II, IIA, IIB, IIC) shall be regarded as a separate subject, provided always that no candidate shall be allowed to take up more than one of these subjects, namely, II, IIA, IIB, and IIC.]

(III) Economics and Political Science.

(IV) Mental and Moral Philosophy.

(V) Mathematics.

(VI) Linguistics.

(VII) Education.

(VIII) Senior Military Course (This subject may be taken subject to the provisions of Chapter LIII—A).

## B

(I) Physics.

(II) Chemistry.

(III) Physiology.

(IV) Botany.

(V) Zoology.

(VI) Anthropology.

(VII) Psychology.

(VIII) Geography.

(IX) Statistics.

(X) Geology.

No candidate shall be allowed to take up a Vernacular (Pass or Honours)—Bengali, Assamese, Hindi or Urdu—under Group A (I) above, unless he had previously passed a University Examination in either Sanskrit or Pali or Arabic or Persian.

No candidate shall be allowed to take up Mental and Moral Philosophy unless he has taken up Logic in the Intermediate Examination in Arts. No candidate shall be allowed to take up any subject in Group B or Mathematics, who has not taken up the corresponding subject in the Intermediate Examination :

Provided that a student may be allowed to take up Psychology if he has taken up any one of the following subjects in the Intermediate Examination—Psychology, Physiology, Biology, Physics, Mathematics or Anthropology : Provided further that no student shall be permitted to take up Botany if he has not taken up Botany or Biology for the Intermediate Examination : Provided also that no candidate shall be allowed to

take up Statistics for the B.A. Examination if he has not taken up Mathematics for the Intermediate Examination.

No candidate shall be allowed to take up Mental and Moral Philosophy along with Psychology.

No candidate shall be allowed to take up Education along with Mental and Moral Philosophy or Psychology.

7. A candidate may take the Pass Course in four subjects or he may take the Pass Course in three subjects and the Honours Course in one subject only ; but there shall be no Honours Course in the Vernacular under Section 6 (2) above.

8. There shall be three papers in the Pass Course and six papers in the Honours Course in every subject except the Vernacular. In that subject only one Pass paper shall be set. Each paper shall be of three hours and shall carry 100 marks.

9. In the syllabuses hereinafter defined Papers I, II and III shall be on the Pass Course, but questions set for Honours candidates need not be identical with those set for Pass candidates. Papers IV, V and VI shall be for Honours candidates only.

10. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed in the Pass Course, arranged in alphabetical order, together with a list of those who have obtained Honours in each branch, arranged in two classes, both in order of merit. Names of candidates who pass the examination under Section 4C above shall be published separately, arranged in alphabetical order, without any class or distinction. Each successful candidate shall receive with his degree of B.A. a certificate in the form entered in Appendix A.

11. The syllabuses in Mathematics and in the subjects under Group B shall be identical in the B.A. and B.Sc. Examinations and will be found under the B.Sc. Regulations.

There shall be a practical examination in all subjects included in Group B.

12. The following syllabuses define the subjects prescribed for the B.A. Examination. Books shall be recommended, where necessary, by the Board of Studies concerned.

## ENGLISH

1. In Papers I, II, IV and V, not more than half the marks shall be given for explanation of passages set from the prescribed texts.

2. In these papers, questions may be asked to test the candidate's appreciation of the books he has studied in the course, but questions encouraging the mere reproduction of literary criticisms shall not be set.

3. The subjects and marks shall be respectively divided as follows :—



*Paper I.*

Poetry and Drama texts	..	100 marks.
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*Paper II.*

Prose texts	..	100 marks.
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In regard to the subject of these two papers students shall be expected to possess a general knowledge of the life and literary career of the authors whose works are prescribed.

*Paper III.*

(a) Essay	..	50 marks.
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(b) Unseen passages from authors or works of the same standard of difficulty as those prescribed for the Intermediate Examination	.. 50	marks.
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## 4. Additional Honours Papers.

*Paper IV.*

(a) Additional Poetry and Drama texts	.. 75	marks.
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(b) Additional unseen passages in Poetry and Drama	.. 25	marks.
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*Paper V.*

(a) Additional Prose texts	.. 75	marks.
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(b) Additional unseen passages in Prose	.. 25	marks.
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In Papers IV and V the unseen passages shall not be of a higher standard of difficulty than the prescribed texts.

*Paper VI.*

(a) General History of English Literature	.. 40	marks.
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(b) Study of Special Authors	.. 30	marks.
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(c) Philology of the English Language	.. 30	marks.
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5. No texts or unseen passages shall be taken from Spenser or from authors earlier than the Elizabethan period.

## VERNACULARS

1. The course in Vernacular shall include select texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies concerned.

The Syndicate shall also draw up, on the recommendation of the Board, a small selection of books by notable authors as showing the standard up to which students will be expected to have read.

2. The examination shall include—

(a) Questions on the subject-matter and on the language of the prescribed texts	.. 40	marks.
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(b) An unseen passage to be summarised or amplified in the Vernacular	.. 15	marks.
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(c) Translation from English into Vernacular	15	marks.
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(d) Questions on Composition	.. 10	marks.
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(e) An Essay in Vernacular—headings being given	.. 20	marks.
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3. (a) The unseen passage shall not exceed in difficulty the Vernacular texts prescribed for the examination.

(b) Questions shall not be set on the history of language or literature of the Vernacular.

4. The Alternative Paper in English (for candidates whose Vernacular is a language not included in the prescribed list) shall include :

(a) Questions on selected texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies in English ; and

(b) Questions on composition including Rhetoric and Prosody.

5. A candidate who takes a Vernacular (Pass or Honours) Bengali, Assamese, Urdu or Hindi as a subject, under Group A (I) in sub-sections (3) and (4) Section 6, will be examined in an Additional Vernacular, in lieu of the compulsory paper, as outlined in sub-section (2). The marks in that paper shall be distributed as follows :—

*Bengali, Assamese and Hindi*

History of Literature	..	.. 40	<i>marks.</i>
History of Language	..	.. 30	<i>marks.</i>
Essay	..	.. 30	<i>marks.</i>

*Urdu*

History of Literature	..	.. 50	<i>marks.</i>
History of Language	..	.. 25	<i>marks.</i>
Essay	..	.. 25	<i>marks.</i>

ALTERNATIVE PAPER IN ENGLISH

The special paper shall be a test in English Composition and on a general knowledge of the subject-matter of a small number of standard works in English (not exceeding three) to be prescribed by the Syndicate from time to time on the recommendation of the Board of Studies in English.

SANSKRIT

The Pass Course in Sanskrit shall comprise the following :—  
*Paper I.*

- (a) Poetry texts, namely, selected portions of  
Manu and selected portions of one of  
the following :— .. 75 *marks.*  
    Kiratarjuniya  
    Sisupalabadha
- (b) Translation from English into Sanskrit .. 25 *marks.*

*Paper II.*

- (a) Drama texts, namely, two of the following\* :— 75 marks.  
     Sakuntala  
     Uttararamacharita  
     Mudrarakshasa  
     Ratnavali
- (b) Translation from English into Sanskrit .. 25 marks.

*Paper III.*

- (a) Prose passages from unprepared Sanskrit books for translation into English .. 30 marks.
- (b) Questions on Sanskrit Grammar including passages for correction .. 40 marks.
- (c) Outlines of the History of Sanskrit Literature 30 marks.
- The Honours Course in Sanskrit shall comprise, in addition to the Pass Course, the following :—

*Paper IV.*

- (a) Selected portions of Bhattikavya and Kadambari .. 75 marks.
- (b) Translation from English into Sanskrit .. 25 marks.

*Paper V.*

- Selected Hymns from the Rigveda, with Sayana's Commentary thereon .. 100 marks.

*Paper VI.*

Grammar and Rhetoric, namely—

- (a) Siddhanta Kaumudi—Karaka and Samasa 60 marks.
- (b) Dandi—Kavyadarsa. Sahitya Darpan, Chapter VI .. 40 marks.

In the first, second, fourth and fifth papers, the questions on the text shall include—

- (i) Passages from the prescribed texts for translation into English (to carry not more than 25 marks in any paper).
- (ii) Questions on the subject-matter and on the language of the prescribed texts.
- (iii) Questions on Grammar and Prosody (but not Rhetoric), arising out of the prescribed texts.
- (iv) Passages from translation or discussion in English, taken from standard Sanskrit commentaries on the prescribed texts, to be named by the Syndicate from time to time.

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\* The following work has been added by the Syndicate on the recommendation of the Board of Studies in Sanskrit :—Bhāsa's *Swapna-Vāsavadattā*.

In the third paper the unseen passages shall not exceed in difficulty the prose texts set for the Intermediate Examination in Arts.

The Syndicate shall from time to time cause to be prepared and prescribed a text-book in Sanskrit Grammar.

In the sixth paper, questions will be set to test the ability of candidates to apply (a) the Rules of Panini on Karaka and Samasa and (b) the rules of Rhetoric to passages taken from the prescribed texts.

The Syndicate shall, upon the recommendation of the Board of Studies, select the texts in accordance with the syllabus and may also recommend books or specify editions to indicate more fully the extent and standard of knowledge required in any paper.

The Syndicate shall have power to add to the list of specified books other books from time to time on the recommendation of the Board of Studies in Sanskrit.

## BENGALI

The Pass course in Bengali shall comprise the following .—

### *Paper I.*

Poetry Texts	..	..	80 marks.
Metrics	..	..	20 marks.

### *Paper II.*

Prose Texts	..	..	75 marks.
Criticism	..	..	25 marks.

### *Paper III.*

Drama Texts	..	..	80 marks.
Rhetoric	..	..	20 marks.

The Honours course in Bengali shall comprise, in addition to the Pass course, the following :—

### *Paper IV.*

Additional Poetry Texts	..	..	80 marks.
Unseens	..	..	20 marks.

### *Paper V.*

Additional Prose Texts	..	..	80 marks.
Unseens	..	..	20 marks.

### *Paper VI.*

Additional Drama Texts	..	..	80 marks.
Unseens	..	..	20 marks.

## HINDI

The Pass course in Hindi shall comprise the following :—

*Paper I.*

Poetry Texts	..	..	80 marks.
Metrics	..	..	20 marks.

*Paper II.*

Prose Texts	..	..	75 marks.
Criticism	..	..	25 marks.

*Paper III.*

Drama Texts	..	..	80 marks.
Rhetoric	..	..	20 marks.

The Honours course in Hindi shall comprise , in addition to the Pass course, the following :—

*Paper IV.*

Additional Poetry Texts	..	..	80 marks.
Unseens	..	..	20 marks.

*Paper V.*

Additional Prose Texts	..	..	80 marks.
Unseens	..	..	20 marks.

*Paper VI.*

Additional Drama Texts	..	..	80 marks.
Unseens	..	..	20 marks.

## URDU

The Pass Course in Urdu shall comprise the following :—

*Paper I.*

(a) Old Poetry Texts	..	..	50 marks.
(b) Modern Poetry Texts	..	..	50 marks.

*Paper II.*

(a) Prose Texts (Old and Modern)	..	..	75 marks.
(b) Translation from English into Urdu	..	..	25 marks.

*Paper III.*

(a) Drama	..	..	80 marks.
(b) Rhetoric	..	..	20 marks.

The Honours Course in Urdu shall comprise, in addition to the Pass Course, the following :—

*Paper IV.*

(a) Additional Poetry Texts	..	..	80 marks.
(b) Unseens (Poetry)	..	..	20 marks.

*Paper V.*

(a) Additional Prose Texts	..	..	80 marks.
(b) Unseens (Prose)	..	..	20 marks.

*Paper VI.*

(a) Principles of Literary Criticism	..	..	50 marks.
(b) Prosody	..	..	20 marks.
(c) Essay in Urdu	..	..	30 marks.

## ASSAMESE

The Pass Course in Assamese shall comprise the following :—

*Paper I.*

Drama Texts	..	..	75 marks.
Rhetoric and Grammar	..	..	25 marks.

*Paper II.*

Old Poetry Texts	..	..	50 marks.
Modern Poetry Texts	..	..	50 marks.

*Paper III.*

Prose Texts (Old and Modern)	..	80 marks.
Translation from English into Assamese	..	20 marks.

## ARABIC

1. The course in Arabic shall consist of Selections in Prose and Poetry containing passages in various styles, simple as well as ornate, chosen from the standard works of representative authors of different periods down to the present time. It shall be compiled from any or all of the following works in Classical and Modern Arabic :—

*Prose**Literature :*

Qur'an with Tafsir Madarik.  
as-Sahih, of Muslim.  
Kitab-al-Bayan wa at-Tahyin, of al-Jabiz.  
al-Kamil, of al-Mubarrad.  
Kitab al-aghani (Rannat al-Mathalita wa al-Mathani, Vol. I).  
Maqamat, of Badi 'az-Zaman.  
al-Mustatrif.

*History :*

al-Buldan of al-Baladhuri.  
Muruj adh-Dhahao of al-Mus'ddi.  
Kitab al-Adab as-Saltaniyyah of Ibn at-Tiqtaqa.  
al-Khitat wa al-Athar of al-Maqrizi.

*Historical Geography :*

Rihlat, of Ibn Jubair.

*Biography :*

Kitab at-Tabaqat al-Kabir of Ibn Sa'd.

*Sufism :*

Ihya 'U-'Ulum ad-Din, of al-Ghazali.

*Modern Literature :*

Essays of Rifa'i.

*Poetry*

- Diwan of 'Abid b. al-Abras.  
 „ Hassan b. Thabit.  
 „ Mutanabbi.  
 „ al-Hamassah, of Abu Tammam.  
 „ 'Umar b. Abi Rabi'ah.  
 „ Ibn al-Mu'tazz.  
 „ Ibn ar'Rumi.  
 „ Ibn Hani.  
 „ Shawqi.

The Board of Studies concerned may make such changes in the list of books as may seem desirable to them.

The course shall include outlines of history of Arabic Literature, Elementary Rhetoric and Arabic Grammar according to the modern method.

2. The Honours course shall include, in addition to the above, the whole or selected portions of the following works :—

*Prose**Literature :*

- Qur'an with Tafsir of al-Baidawi.  
 as-Sahih of al-Bukhari.  
 al-Iqd al-Farid, of Ibn Abdi Rabbihi.  
 'Uyūm al-Akhbar, of Ibn Qutaibah (Khutab).  
 Kitab al-Aghani (Beirut Selections, Vol. II).  
 Kitab al-Amali of Abu 'Ali al-Qali.  
 al-Magamat of al-Hariri.

*History :*

- as-Sirah, of Ibn Hisham.  
 Tarikh, of at-Tabari.  
 al-Muqaddimah of Ibn Khaldun.

*Biography :*

- Irshad al-Arib (Gibb Mem. Ser.).

*Philosophy :*

- Hadiyyah Sa'idiyyah.  
 Hujjat Allah al-Belighah.

*Modern Prose :*

- Absanna Ma Kutibat (al-Hilal Press).

*Poetry*

- al-Mu'allaqat al-'Ashar.  
 al-Mufaddaliyyat.  
 Diwan of Imru'al-Qays.  
 „ al-Khansa.  
 „ al-Akhtal.  
 „ Abu al-'Ala al-Ma'arri.  
 „ Hafiz Ibrahim.

The Honours course shall also include the elements of Arabic prosody and rhetoric and the outlines of the history of Islam to the reign of al-Ma'mun and a general knowledge of the history of Arabic literature.

The Board of Studies concerned may make such modification in the list of books as may seem to them desirable.

The scope of the subject of each paper shall from time to time be defined by the Board concerned and the distribution of the marks may be modified in such manner as may seem desirable to the Board.

3. The subjects and the marks shall be distributed as follows :—

#### PASS COURSE

<i>Paper I</i> —(a) Questions on the Poetry texts	80	marks.
(b) Elementary Rhetoric ..	20	marks.
<i>Paper II</i> —(a) Questions on the Prose texts	70	marks.
(b) Translation from English into Arabic ..	30	marks.
<i>Paper III</i> —(a) Unseen Prose and Poetry Passages ..	50	marks.
(b) Outlines of the History of Arabic Literature ..	50	marks

The unseen passages in this paper shall be of no greater difficulty than the texts prescribed for the Intermediate Examination.

#### HONOURS COURSE

<i>Paper I</i> —(a) Questions on the Pass Poetry texts ..	80	marks.
(b) Elementary Prosody ..	20	marks.
<i>Paper II</i> —(a) Questions on the Pass Prose texts	70	marks.
(b) Translation from English into Arabic ..	30	marks.
<i>Paper III</i> —(a) Unseen Prose and Poetry Passages ..	50	marks.
(b) Outlines of the History of Arabic Literature ..	50	marks.
<i>Paper IV</i> —Questions on the additional Poetry texts ..	100	marks.
<i>Paper V</i> —(a) Questions on the additional Prose texts ..	80	marks.
(b) Elementary Rhetoric ..	20	marks.



<i>Paper VI—</i> (a) Outlines of the History of Islam to the end of the reign of al-Mamun ..	50	<i>marks.</i>
(b) Translation from English into Arabic ..	20	<i>marks.</i>
(c) An Essay in English or Arabic on a subject connected with the History of Islam or the History of Arabic Literature ..	30	<i>marks.</i>

In Papers I, II, IV and V, questions on the texts shall comprise—

- (a) Passages of the set texts for translation into English.
- (b) Questions on the subject-matter, and
- (c) Questions on the Grammar of set passages.

In no paper shall more than one-fourth of the marks of these questions be assigned to mere translation of the set passages.

## PERSIAN

(1) The course in Persian shall consist of selections in Prose and Poetry containing passages in various styles, simple as well as ornate, chosen from the standard works of representative authors of different periods down to the present time. It shall be compiled from any or all of the following works in Classical or Modern Persian :—

### *Prose*

#### *Literary and Ethical :*

Kimiya-i Saadat by al-Ghazali.

#### *History :*

Tarikh-i Tabari, tr. of Abu 'Ali al-Bal'ami.

Siyasat-nama, of Nizam al-Mulk.

Tarikh-i Firozshahi, of al-Barani.

#### *Historical Geography :*

Nuzhat al-Qulub, of Hamdullah al-Mustawfi Al-Qazwini.

#### *Biography :*

Muntakhab at-Tawarikh, by al-Bada'uni.

Mkizannah-i 'Amirah, by *Azad*.

Khulasat at-Tawarikh, by Sujān Rai.

#### *Modern Persian :*

Intisharat-i Iranshahr (Vols. I-II) (Published in Berlin).

*Drama and Poetry**Mathnawi :*

Shah-nama, of Firdausi.  
 Mathnawi, of Jalal au-Din Rumi.  
 Ramayan of *Masih* Panipati.

*Qasidah :*

Qasa'id-i *Minuchihri*.  
 „ *Zahir-i Faryabi*.  
 „ *Kamal-Isma'il*.  
 „ *Qa'ani*.

*Ghazal :*

Ghazaliyyat-i *Rudaki*.  
 „ *Sa'di*.  
 „ *Hafiz*.  
 „ *Sa'ib*.  
 „ *Brahman*.  
 „ *Tahirah* (*Qurrat at'-Ayn*.)

*Miscellaneous :*

Payam-i *Mashriq*, of *Iqbal*.  
 Zabur-i 'Ajam.

*Modern Persian :*

Shu'ara-i 'Asr- Pahlavi, by D. J. Irani.

*Drama :*

Rastakhiz, of *Mirzadeh 'Ishqi*.

The course shall include outlines of the history of **Persian** literature, Elementary rhetoric and prosody and **Persian** Grammar according to the modern method.

(2) The Honours Course shall include, in addition to the above the whole or selected portions of the following works :—

*Prose**Literature :*

Tafsir-i-Qur'an, Edited by H. M. Shirani.  
 Chahar Maqalah, of *Nizami-i-Arudi*.

*Sufism :*

Kashf al-Mahjub, of al-Hujwiri.

*Ethical Philosophy :*

Ausaf al-Ashraf, of *Nasir ad-Din at-Tusi*.

*History :*

Jami'at Tawarikh of *Rashid ad-Din*.  
 Akbarnama, of *Abu Al-Fadl Allami*.

*Biography :*

Sarw-i Azad, by *Ghulam 'Ali Azad*.

*Modern Persian :*

Bist Maqalab-i Qazwini (Vols. I and II).

*Miscellaneous :*

Gathas, Translation of *Poure Davood*.

*Poetry.**Qasidah :*

- Qasa'id-i Mu'zzi.  
 „ Khaqani.  
 „ Anwari.  
 „ 'Urfi.

*Ghazal :*

- Ghazaliyyat-i Jalal ad-Din Rumi.  
 „ Naziri.  
 „ 'Iraqi.  
 „ Ghalib.

*Ruba'i :*

- Raba'iyat-i Raba Tahir.

The Honours Course shall also include the Elements of Persian Prosody and Rhetoric ; the outlines of the history of Islam in Persia and India ; and a general knowledge of the history of Persian Literature.

The Board of Studies concerned may make such modification in the list of books as may seem to them desirable.

The scope of the subject of each paper shall from time to time be defined by the Board concerned and the distribution of the marks may be modified in such manner as may seem desirable to the Board.

3. The subjects and the marks shall be distributed as follows :—

## PASS COURSE

<i>Paper I</i> —(a) Questions on the Poetry texts ..	75 marks
(b) Elementary Rhetoric and Prosody ..	25 marks
<i>Paper II</i> —(a) Questions on the Prose texts ..	70 marks
(b) Translation from English into Persian.	30 marks
<i>Paper III</i> —(a) Unseen Prose and Poetry Passages ..	50 marks
(b) Outlines of the History of Persian Literature.	50 marks

The unseen passages in this paper shall be of no greater difficulty than the texts prescribed for the Intermediate Examination.

## HONOURS COURSE

<i>Paper I</i> —(a) Questions on the Pass Poetry texts ..	80 marks
(b) Elementary Prosody ..	20 marks
<i>Paper II</i> —(a) Questions on the Pass Prose texts ..	70 marks
(b) Translation from English into Persian.	30 marks

<i>Paper III</i> —(a) Unseen Prose and Poetry passages	50 marks
(b) Outlines on the History of Persian Literature.	50 marks
<i>Paper IV</i> —Questions on the Honours Poetry texts.	100 marks
<i>Paper V</i> —(a) Questions on the Honours Prose texts.	80 marks
(b) Elementary Rhetoric .. ..	20 marks
<i>Paper VI</i> —(a) Outlines of the History of Islam in Iran and India.	50 marks
(b) Translation from English into Persian.	20 marks
(c) An Essay in English or Persian on a subject connected with the History of Islam or the History of Persian Literature.	30 marks

In Papers I, II, IV and V, questions on the texts shall comprise—

- (a) Passages of the set texts for translation into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the Grammar of the set passages.

In no paper shall more than one-fourth of the marks of these questions be assigned to the mere translation of set passages.

### PALI

1. The Pass course in Pali shall consist of such pieces of Prose and Poetry as may be prescribed by the Syndicate on the recommendation of the Board of Studies concerned from the following works :—

#### *Poetry*

- (a) Samyutta Nikaya.
- (b) Dhammapada.

#### *Prose*

- (a) Majjhima Nikaya.
- (b) Atthakathas.
- (c) Milindapanha.
- (d) Pancatantra (Sanskrit).

To the above list other works may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies concerned.

The course shall include an elementary knowledge of Sanskrit and Prakrit Grammar, besides a knowledge of Pali Grammar and the elements of Comparative Philology.

2. The Honours course shall, in addition to the above, consist of selected portions of the following works :—

*Poetry*

- (a) Thera- and Theri-gatha.
- (b) Sutta Nipata.
- (c) Saundarananda Kavya.
- (d) Pali Chronicles.

*Prose*

- (a) Digha Nikaya.
- (b) Vibhanga (of the Abhidhamma-pitaka).
- (c) Vinaya Pitaka (Culla-vagga).
- (d) Samantapasadika (Introduction).

To the above list other works may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies concerned.

The Honours course shall include a knowledge of Sanskrit Grammar up to the Intermediate standard and of the History of Buddhism with special reference to India.

The subjects and the marks shall be distributed as follows :—

*Paper I.*

- (a) Questions on the Poetry texts .. .. 70 marks
- (b) Unseen passages of Pali Poetry for translation into English. 30 marks

*Paper II.*

- (a) Questions on the Prose texts .. .. 70 marks
- (b) Unseen passages of Pali Prose for translation into English. 30 marks

*Paper III.*

- (a) Questions on Sanskrit Grammar .. 15 marks
- (b) Questions on Pali Grammar .. 15 marks
- (c) Questions on Prakrit Grammar .. 15 marks
- (d) Questions on Comparative Philology .. 30 marks
- (e) Simple English passages for translation into Pali. 25 marks

*Paper IV.*

- (a) Questions on the additional Poetry texts .. 40 marks
- (b) Unseen passages of Pali Prose for translation into English. 30 marks
- (c) Questions on Sanskrit Grammar .. 30 marks

*Paper V.*

- (a) Questions on the additional Prose texts .. 40 marks
- (b) Unseen passages for translation into English 30 marks
- (c) Questions on Prakrit Grammar .. 30 marks

*Paper VI.*

- (a) Questions on the History of Buddhism .. 70 marks
- (b) Questions on Comparative Philology .. 30 marks

In Papers I, II, IV and V, questions on the texts shall comprise—

- (a) Passages of the set texts for translation into English.
- (b) Questions on the subject-matter, and
- (c) Questions on the Grammar of the set passages.

In no paper shall more than one-fourth of the marks of these questions be assigned to the mere translation of set passages.

### HEBREW

1. The Pass Course in Hebrew shall comprise specified portions of the Historical books, the Psalms and Proverbs. The course shall include Jewish History.

2. The Honours Course shall include, in addition to the above, two Prophetical books, and the History of the Hebrew Language and Literature.

3. The marks shall be distributed as follows :—

#### *Paper I.*

- |   |          |
|---|----------|
| (a) Questions on the specified Historical texts ..                      | 70 marks |
| (b) Unseen passages from Historical books for translation into English. | 30 marks |

#### *Paper II.*

- |   |          |
|---|----------|
| (a) Questions on the Psalms and Proverbs ..                           | 70 marks |
| (b) Unseen passages from poetical books for translation into English. | 30 marks |

#### *Paper III.*

- |   |          |
|---|----------|
| (a) English passages for translation into Hebrew                                    | 50 marks |
| (b) Questions on the History of the Jews, and on the literary history of the Bible. | 50 marks |

#### *Paper IV.*

- |  |          |
|--|----------|
| (a) Questions on the specified Prophetical books | 70 marks |
| (b) English passages for translation into Hebrew | 30 marks |

#### *Paper V.*

- |  |          |
|--|----------|
| (a) Unseen passages from the Historical books for translation into English.  | 40 marks |
| (b) Unseen passages from the Prophetical books for translation into English. | 30 marks |
| (c) English passages for translation into Hebrew                             | 30 marks |

#### *Paper VI.*

- |  |          |
|--|----------|
| (a) Questions on the Hebrew Language and Literature. | 50 marks |
| (b) Questions on Jewish History .. .. .              | 50 marks |

In Papers I, II and IV, questions on the texts shall comprise—

- (a) Passages of the set texts for translation into English.
- (b) Questions on the subject-matter, and
- (c) Questions on the Grammar of the set passages.

In no paper shall more than one-fourth of the marks of these questions be assigned to the mere translation of set passages.

## ARMENIAN

1. The Pass Course in Armenian shall consist of the following texts :—

*Poetry*

Bagratoonie's translation of "Paradise Lost," Books IX, X, XI, XII.

*Prose*

Agathangalo's History, Parts I and III, Moses of Khoren's History.

The course shall include the History of Armenia.

2. The Honours Course shall include in addition to the above—

*Poetry*

Bagratoonie's Haik Dientsazn, Books I, II, III, IV and V.

*Prose*

John Catholicus.

Elishe.

The course shall include the History of Armenian Literature and the elements of Armenian Philology.

The marks shall be distributed as follows :—

*Paper I.*

- |  |          |
|--|----------|
| (a) Questions on the Poetry texts .. ..                              | 70 marks |
| (b) Unseen passages of Armenian Poetry for translation into English. | 30 marks |

*Paper II.*

- |   |          |
|---|----------|
| (a) Questions on the Prose texts .. ..                              | 70 marks |
| (b) Unseen passages of Armenian Prose for translation into English. | 30 marks |

*Paper III.*

- |   |          |
|---|----------|
| (a) English passages for translation into Classical Armenian. | 50 marks |
| (b) Questions on Armenian Grammar .. ..                       | 20 marks |
| (c) Questions on the History of Armenia .. ..                 | 30 marks |

*Paper IV.*

- |   |          |
|---|----------|
| (a) Questions on the additional Poetry texts ..     | 70 marks |
| (b) English passages for translation into Armenian. | 30 marks |

*Paper V.*

- |   |          |
|---|----------|
| (a) Questions on the additional Prose texts | 70 marks |
|---|----------|

- (b) English passages for translation into Armenian. 30 marks

*Paper VI.*

- (a) Unseen passages in Armenian for translation into English. 40 marks
- (b) Questions on the History of Armenian Literature. 30 marks
- (c) Questions on Armenian Philology. 30 marks
- In Papers I, II, IV and V, questions on the texts shall comprise—

- (a) Passages of the set texts for translation into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the Grammar of the set passages.

In no paper shall more than one-fourth of the marks of these questions be assigned to the mere translation of set passages.

## GREEK

1. The Pass Course in Greek shall consist of suitable selections from the following authors to be prescribed from time to time by the Board of Studies concerned :—

Plato, Herodotus, Homer, Euripides, Aristophanes, Sophocles, Demosthenes.

The course shall include Greek Syntax and Grammar, and Greek History as prescribed for the Intermediate in Arts.

2. The Honours Course shall include, in addition to the Pass Course, selections from the following authors, to be prescribed from time to time by the Board of Studies concerned :—

Thucydides, *Æschylus*,

and may also include further selections from the authors mentioned in Regulation 1.

The course shall include the Philology of the Greek Language as well as the History of Classical Greek Literature.

3. The subjects and marks shall be distributed in the same way as in the case of Armenian.

## LATIN

1. The Pass Course in Latin shall consist of suitable selections from the following authors to be prescribed from time to time by the Board of Studies concerned :—

Cicero, Livy, Lucan, Virgil, Horace.

The course shall include Latin Syntax and Grammar, and Roman History as prescribed for the Intermediate in Arts.

2. The Honours Course shall include, in addition to the Pass Course, selections from the following authors to be prescribed from time to time by the Board of Studies :—

Pliny, Tacitus, Terence, Lucretius, Catullus,



and may also include further selections from the authors mentioned in Regulation 1.

The course shall include the Philology of the Latin Language as well as the History of Latin Literature to the end of the Augustan Period.

3. The subjects and marks shall be distributed in the different papers in the same way as in the case of Armenian.

### FRENCH AND GERMAN

1. The course in French or German for the Pass as well as for the Honours shall consist of such works in prose and verse as may be prescribed from time to time by the Board of Studies concerned.

2. The Pass Course shall include in addition to the prescribed texts, Grammar and the Outlines of French or German History.

3. The Honours Course shall include, in addition to the subjects mentioned in Regulations 1 and 2 above, the elements of French or German Philology and the History of a selected period of French or German Literature.

4. The subjects and marks shall be distributed in the same way as in the case of Armenian.

### ITALIAN

1. The course in Italian for the Pass as well as for the Honours shall consist of such works in prose and verse as may be prescribed from time to time by the Board of Studies concerned.

2. The Pass Course shall include, in addition to the prescribed texts, Grammar and the outlines of Italian History.

3. The Honours Course shall include, in addition to the subjects mentioned in Regulations 1 and 2 above, the Elements of Italian Philology and the History of a selected period of Italian Literature.

4. The subjects and marks shall be distributed in the same way as in the case of Armenian.

### LINGUISTICS

This subject can be taken up only by candidates who take up one of the Languages specified in A (I) or Anthropology or History.

The Pass Course in Linguistics shall include the General Principles of Linguistic Science, Growth and Development of Languages, Phonetics, the Language-Families of the World, and the Languages of India.

The Honours Course in Linguistics shall include the topics prescribed for the Pass Course, to be studied in greater detail. In addition, it will include the Comparative and Historical Grammar of English, or of the language chosen from A (I), illustrated by selected texts. It shall further include a cognate language to be chosen out of an allied group according to a scheme to be recommended from time to time by the Board of Higher Studies in Comparative Philology. Easy texts in the cognate language shall be prescribed.

## HISTORY

1. The Pass Course in History shall be as follows :—

*Paper I.*—Indian History.

*Paper II.*—European History (1648-1815).

*Paper III.*—General History from 1815 to such date as may be fixed by the Board of Studies in History from time to time (with special reference to Europe).

2. The Honours Course shall comprise in addition to the above :—

*Paper IV.*—Special period of Indian History.

*Paper V.*—Special period of European History before 1648.

*Paper VI.*—

(a) Special period of Greek History.

(b) Special period of Roman History.

(c) Special period of the History of Islam outside India.

(d) Special period of the History of Hindu Colonial Expansion outside India.

The Honours Course is to be studied with some reference to the original sources.

In each of the Honours Papers IV and V two special subjects shall be prescribed, of which candidates will be at liberty to choose one. In the Honours Paper VI four special subjects, one special subject for each of the special periods mentioned in (a), (b), (c) and (d), will be prescribed and candidates will have the choice of one special subject out of four.

The list of special subjects shall be revised from time to time.

Candidates shall be expected to possess a knowledge of the geography of the countries whose history they study, and to understand the use of physical and historical maps.

Books on History shall be recommended from time to time by the Board of Studies concerned who shall also select the special periods.

## INDO-ISLAMIC AND WORLD HISTORY

The Pass Course in Indo-Islamic and World History shall be as follows :—

*Paper I.*—Ancient Indian History.

*Paper II.*—Outline of Islamic History.

*Paper III.*—A Selected Period of or Movement in World History.

The Honours Course shall comprise in addition to the above—

*Paper IV.*—A Special Period of Ancient Indian History.

*Paper V.*—A Special Period of the History of Mediaeval India.

*Paper VI.*—General History of the East (Modern).

Candidates will be expected to possess a knowledge of the geography of the countries whose history they study and to understand the use of physical and historical maps.

The Honours Course is to be studied with some reference to the original sources.

The list of subjects may be revised from time to time by the Syndicate on the recommendation of the Board of Studies concerned. The Special Periods to be studied shall also be selected by the Syndicate on the recommendation of the Board of Studies concerned.

## ISLAMIC HISTORY AND CULTURE

The Pass Course in Islamic History and Culture shall be as follows :—

*Paper I.*—History of Islam in India.

*Paper II.*—Islamic Culture and Civilisation outside India.

*Paper III.*—A Selected Period of or Movement in World History.

The Honours Course shall comprise in addition to the above—

*Paper IV.*—A Special Period of the History of Islam outside India.

*Paper V.*—A Special Period of the History of Islamic Culture and Civilisation outside India.

*Paper VI.*—Special Studies in Islamic and Hindu Cultures in India.

Candidates will be expected to possess a knowledge of the geography of the countries whose history they study and to understand the use of physical and historical maps.

The Honours Course is to be studied with some reference to the original sources.

The list of subjects may be revised from time to time by the Syndicate on the recommendation of the Board of Studies concerned. The Special Periods to be studied shall also be selected by the Syndicate on the recommendation of the Board of Studies concerned.

## ANCIENT INDIAN AND WORLD HISTORY

The Pass Course in Ancient Indian and World History shall be as follows :—

*Paper I.*—Ancient Indian History.

*Paper II.*—Social, Political and Economic Institutions of Ancient India.

*Paper III.*—A Selected Period of or Movement in World History.

The Honours Course shall comprise in addition to the above—

*Paper IV.*—A Special Period of Ancient Indian History with full treatment of Religious and Cultural activities of the

*Paper V.*—History of Bengal and Kamarupa till the thirteenth century A.D.

*Paper VI.*—One of the following Special subjects :—

(a) History of Hindu Colonial and Cultural Expansion.

(b) Contact between Hindu Culture and Islam.

(c) Pre-historic Culture of the Indus Valley, and connected Civilisations of the Ancient World.

Candidates will be expected to possess a knowledge of the geography of the countries whose history they study and to understand the use of physical and historical maps.

The Honours Course is to be studied with some reference to the original sources.

The list of subjects may be revised from time to time by the Syndicate on the recommendation of the Board of Studies concerned. The Special Periods to be studied shall also be selected by the Syndicate on the recommendation of the Board of Studies concerned.

## ECONOMICS AND POLITICAL SCIENCE

1. The Pass Course in Economics and Political Science shall be as follows :—

*Paper I.*—Economics.

*Paper II.*—

(i) Political Theory.

(ii) Political Institutions (Constitution and Administration of India and outlines of the Constitutions of England, the U. S. A., the U. S. S. R. and Switzerland).

*N.B.*—(i) and (ii) shall be two equal halves.

*Paper III.*—Application of the Principles of Economics to Indian topics.

2. The Honours Course, in addition to the above, shall be as follows :—

*Paper IV.*—Economics (a higher course).

*Paper V.*—Political Theory (a higher course), including a specially selected text or texts.

*Paper VI.*—

(i) Outlines of Current International Affairs .. 50 marks

(ii) Essay .. .. . 50 marks

3. The following are the Syllabuses for the different subjects :—

### ECONOMICS

Definition. Scope. Relation to Sociology. Politics. Statistics. Methods. Standpoints and Schools. Postulates. Wealth. Utility. Income.

A knowledge in outline of the fundamental propositions under each head of division named below. A fuller knowledge of the special points mentioned below under these heads :—

(a) *Production*.—Production on a large and on a small scale. Land. Labour. Capital. Laws of Return. Population. Organisation of Labour. Control of Business.

(b) *Consumption*.—Demand and Supply. Balance between the two.

(c) *Distribution*.—Rent. Wages. Profits. Systems of Rent and Land Tenure. Custom.

(d) *Exchange*.—Value. Price. Money. Bimetallism. Banks. Foreign Exchange. Credit. Trade, Home and Foreign. International Values.

(e) *Descriptive Economics*.—Companies and Partnership, Organisation of Industries, Trades Unions, Co-operation in the spheres of Production and Distribution, Co-operative Credit Societies. Banking systems. Money Market. Stock Exchange.

(f) *Economic functions of Government*.—Economic Freedom. Government regulation of, and Government participation in, the work of production, distribution and exchange. Taxation. Public Revenue and Expenditure. National Debt. Private Property. Socialism. Poor Laws. Free Trade. Protection. Reciprocity.

Economic Progress on the work of reproduction, distribution, and exchange.

### POLITICAL SCIENCE

Definition. Scope. Methods.

The State. Leading Theories of its origin and nature. Law. Government.

The People of the State. The Nation. Nationality as a constituent element of the State. Political Society. Its Divisions. Privileged Classes. Citizenship. Classes without political rights.

Rights and Duties. History of Natural Law. Practical consequences of a belief in Natural Law.

The territory of the State. Its Political Divisions.

The Constitution of the State. Different forms of Constitutions. Monarchy, Oligarchy, Aristocracy, Democracy, City States. The present Constitutions and Administrations of the Central, State and Local Governments in India and the outlines of the present Constitutions of Great Britain, the United States, Switzerland and the U. S. S. R.

The Structure of the State. The Legislature. The Executive. The Judiciary. Power of Taxation. Control of the Public Purse. Test of Popular Liberty.

Growth of the State. Revolutions. Evolution. Functions of Legislation. The Individual and the State.

The End and Functions of the State. Sovereignty and Subjection. The nature and organisation of the Public Services.

#### APPLICATION OF THE PRINCIPLES OF ECONOMICS TO INDIAN TOPICS

##### *The Geographical Factor.*

Physical features and conditions of the country and their bearings on Indian economic products. Facilities of Transport.

##### *The Special Factor.*

The Village system and Rural economy. Peasant proprietorship. Caste and its economic significance. Its influence on the organisation of Indian Industries. The Joint Family, and Hindu and Mahomedan Laws of Inheritance in regard to their economic bearings and consequences. Status and custom, and their influence on rents, wages and prices. Organisation of agriculture, handicraft and domestic industries in rural India. Caste Guilds. City Industries. Mahomedan Guilds and Industries. Indigenous organisation of Trade and Transport: of Banking and Agricultural credit.

##### *The Political Factor.*

Chief Indian systems of Land-tenure with their economic consequences. Foreign capital and organisation of labour, machinery, transport and credit, and the economic development of the country. The Balance of Trade.

The postulates of pure Economy, how modified in their application to Indian Consumption, Production, Distribution and Exchange.

*Consumption.*—The Indian standard of comfort as determining Indian consumption; the laws of consumption; statistics of Indian consumption; comparison with the United Kingdom.

##### *Production—*

- (a) The economics of a mainly agricultural country as opposed to those of a mainly manufacturing country.

- (b) Special conditions of land, labour and capital as affecting Indian production.
- (c) Comparative efficiency of labour and cost of production in the chief industries in India and other countries. National wealth of India. Average production per head. Average income, gross and net.
- (d) The development of manufacturing industries in India. Foreign capital and skill. Technical Education and its relation to castes and guilds.

*Distribution.*—Rent in India, as affected by (1) State Landlordism, (2) Permanent Zemindary settlements, (3) Pressure of population on the soil, (4) Land-tenure legislation and rent laws, (5) Custom.

Wages in different employments. Average rates. Purchasing power of wages.

*Profits.*—Profits of manufacture. The profits of the middleman as agricultural money-lender, and as commercial agent.

*Exchange.*—The Indian Balance of Trade. India's debt and the Home Charges. Currency Legislation and Foreign Exchange. The Gold Standard and its influence on prices. The Gold Reserve. The Gold and Silver Currency. Purchasing power of money. Commercial Legislation.

*Public Finance.*—Direct and indirect taxation. Chief heads of Revenue. Nature of land revenue in India. Incidents of taxation in India. Chief heads of Expenditure. Central, State and Local Finance.

## MENTAL AND MORAL PHILOSOPHY

- (1) The arrangement of papers shall be as follows :—

### *Pass Course*

#### *Paper I.*

Psychology ..	..	..	..	100 marks
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#### *Paper II.*

(a) Ethics ..	..	..	..	50 marks
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(b) Indian Philosophy ..	..	..	..	50 marks
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or

(b) Islamic Philosophy ..	..	..	..	50 marks
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#### *Paper III.*

General Philosophy ..	..	..	..	100 marks
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### *Honours Course*

#### *Paper I.*

Psychology ..	..	..	..	100 marks
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#### *Paper II.*

Ethics ..	..	..	..	100 marks
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#### *Paper III.*

General Philosophy ..	..	..	..	100 marks
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*Paper IV.*

Philosophy of Religion .. .. .	100 marks
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*Paper V.*

History of Philosophy :

General .. .. .	80 marks
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Special Texts .. .. .	20 marks
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*Paper VI.*

(a) Indian Philosophy .. .. .	60 marks
<i>or</i>	

(a) Islamic Philosophy .. .. .	60 marks
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(b) Essay .. .. .	40 marks
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(2) The syllabus for the different subjects shall be as follows :—

*Paper I.*

## PSYCHOLOGY

*(Pass and Honours)*

*Definition*—Traditional and Modern. Relation of Psychology to Physiology, Sociology, Philosophy and Education.

*Methods*—Introspection : Observation and Experiment. The Genetic Method. The different schools of Psychology.

*Consciousness*—The Sub conscious and the Unconscious. Mental states and processes.

*Sensation*—Stimulus and Response. Organic Sensations. Organs and sensations of Taste, Smell, Touch, Audition, Vision. Kinæsthetic sensations.

*Mental Measurement*—Weber's Law, Fechner's Law.

*Perception*—The Psychological Problem. Perceptions of Space, Time, Movement, Weight, Solidity and Distance. Illusions.

*Memory and Learning*—Association, Retention, Recall, Recognition.

*Imagination*—Definition and different forms. Dreams. Hallucinations.

*Feeling and Emotion*—Nature, Classification, Expressions and Theories. Moods and Sentiments.

*Thinking*—Relation to elementary forms of activity. Different types.

*Belief*—Its nature and grounds.

*Attention*—Its Nature, Range, Duration.

*Action*—Reflex and Conditioned Reflex. Instinctive and Habitual actions. Playful and Purposive activity. Voluntary actions.

*Intelligence*—Definition and Analysis. Intelligence and Conduct.



*Physiological Basis of Mental Life*—The Nerves and the Nervous system. The Neurones and the Synapses. The Nerve Centres. The Spinal Cord and the Brain. Sense organs and Motor organs. The Physiology of Emotion.

*Paper II.*

A. ETHICS

(*Pass*)

Definition and province of Ethics.

Relations of Ethics to Psychology, Sociology, Politics and Theology.

Actions—Moral and non-moral. Analysis of desire. Intention. Motive. End. Volition. Sin and Error.

Nature and object of moral judgment.

Postulates of moral judgment. Reason, Personality, Self-determination.

Moral obligation—Nature and grounds. Moral Law. Sense of duty. Sanctions. Theories of reward and punishment.

The leading Ethical standards: Hedonism, Rationalism, Intuitionism and Perfectionism.

Relation of individual and society.

Duties and virtues—their classification. Conflict of duties. Growth of character. The moral ideal.

B. INDIAN PHILOSOPHY

Outlines of Indian Philosophy with special reference to not more than two systems of Indian Philosophy to be prescribed by the Syndicate from time to time on the recommendation of the Board of Studies concerned.

*Or*

B. ISLAMIC PHILOSOPHY

Outlines of the History of Muslim Thought.

The detailed Syllabus in the subjects may be prescribed by the Syndicate from time to time on the recommendation of the Board of Studies concerned.

ETHICS

(*Honours*)

Definition, province and end of Ethics.

Relation of Ethics to Psychology, Sociology, Politics, Metaphysics and Theology.

Actions: Moral and non-moral. Analysis of desire. Intention. Motive. End. Volition. Natural and moral evil. Sin and Error.

Elements of the moral consciousness—Intellectual, emotional, volitional. Good and evil. Right and wrong. The highest good. Moral sentiment.

Beginning and growth of moral consciousness. Early group life. Group morality. Socialising agencies. Custom. Personal morality.

Nature, method and object of moral judgment. Springs of action.

Postulates of moral judgment. Reason, Personality. Self-determination.

Conscience and prudence. The moral faculty.

Moral obligation—Nature, grounds and source of. The seat of authority in morals. Moral Law. Sense of duty. Merit and guilt. Sanctions. Theories of reward and punishment.

The leading Ethical standards and a critical estimate of them. Law—divine, ethical. Pleasure and happiness. Egoism. Altruism. The aesthetic sense. Immutable law and Eternal fitness. Perfectionism and self-realisation. Evolution, individual and social.

Relation of individual and society. The social organism. Moral institutions.

Duties and virtues—Nature and principles of their classification. Conflict of duties.

Growth of character. Moral progress in the race. The moral ideal.

### *Paper III.*

#### GENERAL PHILOSOPHY

(*Pass and Honours*)

*Relation of Philosophy and Science.*—Their difference in method. Relation of Epistemology and Metaphysics.

Relation of Epistemology and Logic. General Theory of Judgment. General nature of Inference.

*Theories of the origin of knowledge.*—Empiricism, Intuitionism, Apriorism.

Space and time. Concept of substance. Theory of causality.

Types of Realism and Idealism.

Theories of Evolution. Matter, Life and Mind as stages of evolution. Value and reality. God and the World. The Absolute.

### *Paper IV.*

#### PHILOSOPHY OF RELIGION

(*Honours*)

The problem and scope of the Philosophy of Religion. Relation to Science of Religion, Psychology of Religion, Metaphysics and Natural Theology.

The origin and development of Religion—Anthropological and Psychological theories and their criticism. Historical development.

The nature of Religion. Relation to Morality, Art, Science and Philosophy.

The religious consciousness. The different elements of cognition, emotion and volition.

*Grounds of Belief in God.*—The cosmological, teleological, moral and ontological proofs.

The nature and attributes of the Divine Being. God and the Absolute. God and the World. God and the individual self. Freedom and immortality. Deism, Theism and Pantheism.

*The Objectivity of Religion.*—The theory of knowledge and the metaphysics of Reality and their bearing on Religion. Anti-religious theories and their criticism : Materialism. Naturalism. Phenomenalism. Agnosticism. Positivism. Pessimism and the problem of evil.

*Paper V.*

## HISTORY OF PHILOSOPHY

(Honours)

A general knowledge of the systems of Bacon, Descartes, Spinoza, Locke, Berkeley, Hume, Leibnitz and Kant, and some specially selected texts.

*Paper VI.*

## (A) INDIAN PHILOSOPHY

(Honours)

Outlines of Indian Philosophy with special reference to not more than four systems to be prescribed by the Syndicate from time to time on the recommendation of the Board of Studies concerned.

Or

## (A) ISLAMIC PHILOSOPHY

(Honours)

Outlines of the main theological and philosophical schools in Islam.

The detailed Syllabus in the subject may be prescribed by the Syndicate from time to time on the recommendation of the Board of Studies concerned.

*Paper VI.*

## (B) ESSAY

*(Honours)*

On subjects drawn from Pass or Honours syllabuses or Texts.

The Syndicate shall prescribe text-books and also recommend books for reference on the recommendation of the Board of Studies concerned.

## EDUCATION

(1) The Pass Course in Education shall be as follows :—

*Paper I.*—Principles of Education.

*Paper II.*—Educational Psychology.

*Paper III.*—Education in India since 1835 with special reference to Bengal.

(2) The Honours Course shall comprise in addition to the above.

*Paper IV.*—New Trends in Education.

*Paper V.*—History of Education (selected period as may be fixed by the Board of Studies in Teaching from time to time).

*Paper VI.*—Selections from Educational Writings and Essay (selection to be made from time to time by the Board of Studies in Teaching).

The detailed syllabuses in the subjects for each paper will be drawn up from time to time by the Syndicate on the recommendation of the Board of Studies concerned.

## GENERAL

1. A candidate must obtain in order to pass in the Pass Course—

In English .. .. .	100 marks
Vernacular or paper alternative to it ..	33 marks
Any subject in Group A .. .. .	100 marks
Any subject in Group B in the Theoretical papers ..	60 marks
and in the Practical papers .. .. .	40 marks

2. A candidate must obtain in order to pass in the Honours Course—

In English .. .. .	180 marks
Any subject in Group A .. .. .	180 marks
Any subject in Group B in the Theoretical papers ..	108 marks
and in the Practical papers .. .. .	72 marks

3. A candidate must obtain, in order to qualify for Honours—

In English .. .. .	240 marks
Any subject in Group A .. .. .	240 marks
Any subject in Group B in the Theoretical papers ..	160 marks
and in the Practical papers .. .. .	80 marks

4. If a candidate takes up the Pass Course in four subjects, he must, in order to pass the B.A. Examination, pass in each subject, and obtain 360 marks in the aggregate. If he passes and obtains 500 marks in the aggregate, he shall be declared to have passed with Distinction.

5. If a candidate takes up the Pass Course in three subjects, and the Honours Course in one subject, he must, in order to pass the B.A. Examination, pass in each subject, and obtain 468 marks in the aggregate. If he passes and also qualifies for Honours in his Honours subject, he shall be declared to have obtained Second Class Honours in that subject. If he passes, qualifies for Honours in his Honours subject and obtains 360 marks in that subject, he shall be declared to have obtained First Class Honours in such subject.

6. Any candidate who has failed in one subject only, and by not more than 5 per cent. of the full marks in that subject and has shown merit by gaining 50 per cent. or more in the aggregate of the marks of the Examination, shall be allowed to pass. If any such candidate has taken up the Pass Course in three subjects, he shall not be declared to have passed with Distinction. But if the candidate has taken up the Pass Course in three subjects and the Honours Course in one subject, and has qualified for Honours in such subject, he shall be allowed to retain his Honours and his place in the Honours list.

7. If the Examination Board is of opinion that in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reasons for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

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## CHAPTER XXXIII

### MASTER OF ARTS

1. An Examination for the degree of Master of Arts shall be held annually in Calcutta and at such other places as shall, from time to time, be appointed by the Syndicate and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

Any candidate who has passed the B.A. or the B.Com. Examination not less than two academical years previously may be examined for the degree of M.A. in any subject mentioned in paragraph 5, provided he has prosecuted a regular course of study in that subject for two academical years in a College or Colleges affiliated to the University in respect of that subject and standard, or in the Post-Graduate classes of the University, subject to the following condition :—

No candidate shall be allowed to prosecute such course of study in the subject taken up by him for the M.A. Examination in an affiliated College or affiliated Colleges, or in the University Post-Graduate classes, unless he has passed the B.A. or B.Com. Examination in that subject or in an allied subject. The Executive Committee of the Council of Post-Graduate Teaching in Arts shall have power, in very special cases, to exempt a candidate from fulfilling this condition only in respect of subjects mentioned in I—XIV-B.

*N.B.*—The Executive Committee of the Council of Post-Graduate Teaching in Arts or Science, as the case may be, will decide which subject is an allied subject.

No candidate shall be allowed to prosecute the course of study in Education unless he has previously passed the B.T. (Bachelor of Teaching) Examination or passed the B.A. Degree Examination having taken Education as one of his subjects.

Any candidate who has passed the B.A. or the B.Com. Examination not less than three academical years previously may be admitted as a Private student to the M.A. Examination in any of the subjects included in I—XV-A, subject to the provisions of Section 19 of the Indian Universities Act.

In the case of any of the subjects included in I—XV-A in which there is for the time being no provision for a regular course of study in the Post-Graduate classes of the University, a candidate who has passed the B.A. or the B.Com. Examination not less than two academical years previously may be admitted to the M.A. Examination in that subject as a private student, subject to the provisions of Section 19 of the Indian Universities Act.

2. Every candidate shall send in his application with a certificate in the form prescribed by the Syndicate, and a fee of Rs. 80 to the Registrar not less than three months\* before the Examination. If a student desires to appear in the M.A. Examination in subjects III, VI, VII, XI or XXII, he shall give the Registrar one year's notice of the fact.

3. Any Master of Arts may, on payment of a fee of Rs. 80, be admitted to the M.A. Examination in any subject or a group comprised in a subject other than that in which he was previously examined, provided that if he takes any of the subjects XVI to XXVI, he has passed the B.A. Examination in such subject or in an allied subject and has prosecuted a regular course of study in that subject for two academical years in a College or Colleges affiliated to the University in respect of that subject and standard, or in the Post-Graduate classes of the University. He shall, if his attainments come up to the standard prescribed for the degree of M.A., be granted a certificate to that effect stating the subject and class in which he has passed.

*N.B.*—The Executive Committee of the Council of Post-Graduate Teaching in Arts or Science, as the case may be, will decide which subject is an allied subject.

4. A candidate who fails to pass or to present himself for examination, shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to any one or more subsequent M.A. Examinations in that subject as a Private student on payment of a like fee of Eighty Rupees on each occasion, subject to the provisions of Section 19 of the Indian Universities Act, provided that in case the candidate offers a Science subject for which a Practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of Practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

4A. If a student, after completion of a regular course of study for the examination does not register himself as a candidate for or present himself at the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required under the Regulations, a certificate from the Head of the Institution at which he studies or from a member of the Senate testifying to his good character during the intervening period, and provided further

\* Candidates who take up Pure Mathematics and Applied Mathematics shall send in their applications and fees to the Registrar six months before the commencement of the Examination.

that in case the student offers a Science subject for which a Practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of Practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

Such a student may appear at any one or more subsequent M.A. Examinations in that subject as a Private candidate on payment of the prescribed fee, subject to the provisions of Section 19 of the Indian Universities Act, provided that in case the candidate offers a Science subject for which a Practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of Practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

5. A candidate may be examined in any of the following subjects :—

- (I) English.
- (II) Sanskrit.
- (III) Pali.
- (IV) Arabic.
- (V) Persian.
- (VI) Hebrew.
- (VII) Syriac.
- (VIII) Greek.
- (IX) Latin.
- (IX-A) French.
- (IX-B) German.
- (X) Modern Indian Language.
- (XI) Comparative Philology.
- (XII) Mental and Moral Philosophy.
- (XIII) History.
- (XIII-A) Ancient Indian History and Culture
- (XIII-B) Islamic History and Culture.
- (XIV) Economics.
- (XIV-A) Political Science.
- (XIV-B) Commerce.
- (XV) Pure Mathematics.



- (XV-A) Applied Mathematics.
- (XVI) Physics.
- (XVI-A) Applied Physics.
- (XVI-B) Radio-Physics and Electronics.
- (XVII) Chemistry.
- (XVII-A) Applied Chemistry.
- (XVIII) Physiology.
- (XIX) Botany.
- (XX) Geology.
- (XXI) Zoology and Comparative Anatomy.
- (XXII) Psychology.
- (XXIII) Anthropology.
- (XXIV) Statistics.
- (XXV) Geography.
- (XXVI) Education.

6. In each of the subjects I to XIV-B there shall be eight papers of four hours each, each carrying 100 marks.

In each of the subjects XV to XXVI the papers and the marks shall be distributed as laid down in the Regulations for the M.Sc. Examination.

7. Candidates who have taken the degree of B.A. with Honours in any of the subjects XV-XXVI may be allowed to substitute a piece of research work for part of the M.A. Examination in that subject under the condition laid down in the Regulations for the M.Sc. Degree.

In all these subjects the Syllabuses shall be the same as those prescribed for the M.Sc. Examination.

8. The limits of the subjects shall be as follows :—

### ENGLISH

1. The M.A. course in English shall be divided into two groups.

The first four papers of each group shall be identical and shall cover the following subjects :—

Paper	I Shakespeare	..	..	100 marks
„	II English Literature (1516-1660),	..	100	„
	excluding Shakespeare.			
„	III English Literature (1660-1798)	..	100	„
„	IV English Literature (1798-1832)	..	100	„

The remaining four papers shall be taken from any one of the following groups, but not from both :—

### Group A

Paper	V English Literature (1832-1892)	..	100 marks
„	VI English Literature (1892 to the	100	„
	present times).		

Paper VII	(a) History of English Literature up to 1516, with selected Old and Middle English texts in Translation.	50 marks
„	(b) Chaucer .. ..	50 „
„ VIII	(a) English Literary criticism with special texts.	50 „

*Or,*

„	(a) Historical English Grammar and Elements of Old English.	50 marks
„	(b) An essay on a subject connected with the Course.	50 „

### Group B

Paper V	(a) Selected Old English Prose text	50 marks
„	(b) Selected Old English Poetry text. Questions shall also be set on the History of Old English Literature and Grammar.	50 „
„ VI	(a) Selected Middle English texts (1100-1350).	50 „
„	(b) Selected Middle English texts (1350-1516) excluding Chaucer. Questions shall also be set on the History of Middle English Literature and Grammar.	50 „
„ VII	(a) Chaucer .. ..	50 „
„	(b) Growth of the English Language from the Old English period to modern times.	50 „
„ VIII	(a) Origins of the English Language	50 „
„	(b) Essay on a subject connected with the Course.	50 „

Each of the Papers I to IV as well as of Papers V and VI of Group A shall be divided into two halves.

(a) The first half shall cover the literary history of the relevant period and, in the case of Paper I, the more important types of Shakespeare criticism, the subjects to be studied with reference to illustrative works which shall be specified from time to time. Candidates will not be expected to possess a detailed knowledge of these.

(b) The second half shall cover prescribed texts of which a detailed knowledge will be required.

(c) The Course for Papers II to IV and Papers V and VI of Group A shall include standard works in Prose, Poetry and the Drama.

(d) Questions on the texts prescribed under (b) shall include (i) Questions on the subject-matter and (ii) Questions on the language of the texts.

A candidate who has taken his B.A. Degree with Honours in English may, subject to the conditions specified below, offer in lieu of examination in Paper VIII of either group a thesis on a topic connected with the Course—

(a) He must intimate to the Head of the Department of English by the 15th of January following his admission to the Post-Graduate Class in English that he proposes to offer a thesis in lieu of examination in Paper VIII. The Head shall assign him to a teacher of the Department under whom the candidate shall prepare a bibliography and a statement indicating, with reference to it, the scope of original research on the topic selected.

(b) He shall, not later than the 15th of July next, submit to the Secretary to the Council of Post-Graduate Teaching in Arts the bibliography and the statement along with application for permission to offer a thesis in lieu of examination in Paper VIII.

(c) The Board of Higher Studies in English shall forthwith appoint a Committee to scrutinise the bibliography and the statement and to prepare a written report. The Committee may ask the candidate to appear before it for interview.

(d) The report shall state if there is any scope for original work on the topic as claimed by the candidate and, if necessary, shall suggest alterations in the line of investigation proposed to be followed.

(e) The Board shall consider the report before disposing of the application. If the application is granted, the thesis shall be prepared under the supervision of the teacher to whom the candidate had been assigned.

(f) The candidate shall deliver three copies of the thesis (printed or type-written) to the Secretary to the Council of Post-Graduate Teaching in Arts, at least a fortnight before the first day of the M.A. Examination at which he intends to appear.

(g) The thesis shall be examined by a Board of three examiners and the maximum number of marks assigned shall be one hundred. The examiners may, in their discretion, subject the candidate to an oral examination with reference to the thesis.

(h) The name of every candidate who passes the M.A. Examination with a thesis shall be marked with an asterisk in the list of successful candidates published in the Gazette and also in the University Calendar.

## SANSKRIT

The course shall include the following :—

## General Papers

*Paper I.*

- |  |          |
|--|----------|
| (a) Select Hymns from the R̥gveda including the first Adhyāya of the Aṣṭaka, with Sāyaṇa's Commentary thereon and a general knowledge of Sāyaṇa's Introduction to his Commentary on the R̥gveda. | 60 marks |
| (b) Other Select Vedic Texts with select Commentaries.   | 40 marks |

*Paper II.*

- |  |          |
|--|----------|
| (a) Select topics of the Siddhāntakaumudī .. | 75 marks |
| (b) Select portions of the Mahābhāṣya ..     | 25 marks |

*Paper III.*

- |   |          |
|---|----------|
| (a) Sanskrit Linguistics including modern interpretation of Sanskrit Grammar.         | 50 marks |
| (b) An Elementary Sanskrit treatise on Logic with select portions of the Sabdakhanda. | 50 marks |

*Paper IV.*

- |  |          |
|--|----------|
| (a) History of Sanskrit Literature ..<br>(The subject should be studied according to the syllabus to be prescribed from time to time). | 60 marks |
| (b) Alaṅkāra ..  | 40 marks |

## Special Papers

## GROUP A—(Classical Literature)

*Paper V.*

- |  |           |
|--|-----------|
| Select Alaṅkāra texts including Dramaturgy with a general knowledge of the development of Alaṅkāra Literature. | 100 marks |
|--|-----------|

*Paper VI.*

- |  |          |
|--|----------|
| (a) Select Poetry Texts (Ancient and Mediæval) | 85 marks |
| (b) Prosody ..                                 | 15 marks |

*Paper VII.*

- |   |          |
|---|----------|
| (a) Select Drama Texts (Ancient and Mediæval) | 80 marks |
| (b) Elements of Prakrit Grammar ..            | 20 marks |

**Paper VIII.**

- |   |          |
|---|----------|
| (a) Select Prose Texts including Campūs (Ancient and Mediæval).   | 70 marks |
| (b) Translation from simple classical Sanskrit unseens into English or from English into Sanskrit or Essay in Sanskrit. | 30 marks |

**GROUP B—(Vedas)****Paper V.**

- |   |          |
|---|----------|
| (a) Select Mantra Texts with select epexegetical works including modern interpretation of the Veda. | 70 marks |
| (b) A Critical Survey of Vedic Literature ..  | 30 marks |

**Paper VI.**

- |  |          |
|--|----------|
| (a) Select Texts from the Brāhmaṇas, the Āraṇyakas and the Upaniṣads with select epexegetical works. | 75 marks |
| (b) Relation of Avesta with the Veda ..  | 25 marks |

**Paper VII.**

- |  |          |
|--|----------|
| (a) Yāska's Nirukta and Vedic metres as in Piṅgala's Chandaḥ Sūtras. | 75 marks |
| (b) A general knowledge on one simple Yajña ..                       | 25 marks |

**Paper VIII.**

- |  |          |
|--|----------|
| (a) Other select Vedāṅga Texts ..  | 70 marks |
| (b) Translation from simple Vedic unseen passages into English or from English into Sanskrit or Essay in Sanskrit. | 30 marks |

**GROUP C—(Mīmāṃsā)****Paper V.**

- |   |          |
|---|----------|
| (a) Jaimini's Mīmāṃsāsūtra (three Adhyāyas including the first and the second) with Śabara's Bhāṣya on the same. Select portions of the Brhatī of Prabhākara. | 70 marks |
| (b) A Critical Survey of Mīmāṃsā Literature ..  | 30 marks |

**Paper VI.**

- |   |           |
|---|-----------|
| Ślokavārttika up to Sūnyavāda ; Select portions from Apohavāda and Sarvajñatva-khaṇḍana ; Śāstradīpikā (1st Adhyāya) ; Smṛtipāda of Tantravārttika. | 100 marks |
|---|-----------|

*Paper VII.*

Jaiminiyanyāyamālāvistara ; Vidhivāda of Bhāṭṭa- 100 marks  
rahasya (Khaṇḍadeva) ; Nyāyaprakāśa.

*Paper VIII.*

- (a) Select portions of the Taittiriya Saṃhitā 70 marks  
(Dārśapūrṇamāsa prakaraṇa) ; Select  
portions of Bodhāyana's or Āpastamba's  
Śrautasūtra with a detailed knowledge  
of the Dārśapūrṇamāsa Yajña : Tantra-  
rahasya of Rāmānujācārya.
- (b) Translation from Sanskrit unseens into 30 marks  
English or from English into Sanskrit  
or Essay in Sanskrit.

GROUP D—(*Vedānta*)*Paper V.*

- (a) Select portions of the Vedāntasūtras with 70 marks  
Śaṅkara-bhāṣya.
- (b) A Critical Survey of Vedānta Literature .. 30 marks

*Paper VI.*

- (a) Select portions of the Vedāntasūtras with 75 marks  
Śaṅkara's Bhāṣya and select portions of  
the Bhāmatī.
- (b) Select texts of Vedānta Dialectics .. 25 marks

*Paper VII.*

Select portions of Pañcapādikā with Vivaraṇa 100 marks  
and select portions of Siddhāntaleśa.

*Paper VIII.*

- (a) Select portions of the Śribhāṣya (on the first 40 marks  
Sūtra only).
- (b) Select systems of Sarvadarśanasamgraha .. 30 marks
- (c) Translation from Sanskrit Unseens into 30 marks  
English or from English into Sanskrit or  
Essay in Sanskrit.

GROUP E—(*Sāṅkhya-Yoga*)*Paper V.*

- (a) Sāṅkhyasūtras with Pravacanabhāṣya .. 50 marks
- (b) Brahmasūtras (2nd Adhyāya—1st and 2nd 50 marks  
pādas only) with Śaṅkara's Commentary.

**Paper VI.**

- |  |          |
|--|----------|
| (a) Sāṅkhyakārikās of Iśvarakṛṣṇa with Commentaries and Sāṅkhyasāra. | 70 marks |
| (b) A Critical Survey of Sāṅkhya and Yoga Literature.                | 30 marks |

**Paper VII.**

- |   |           |
|---|-----------|
| Yogasūtras with Vyāsa-bhāṣya, Tattva-vaiśāradi and Vārtika. | 100 marks |
|---|-----------|

**Paper VIII.**

- |  |          |
|--|----------|
| (a) Select systems of Sarvadarśanasamgraha ..  | 70 marks |
| (b) Translation from Sanskrit Unseens into English or from English into Sanskrit or Essay in Sanskrit. | 30 marks |

GROUP F—(*Nyāya-Vaiśeṣika*)**Paper V.**

- |  |          |
|--|----------|
| (a) Nyāyasūtras of Gautama with Bhāṣya of Vātsāyana. | 70 marks |
| (b) Critical Survey of Nyāya-Vaiśeṣika Philosophy    | 30 marks |

**Paper VI.**

- |   |          |
|---|----------|
| (a) Select portions of Nyāyamañjarī of Jayanta-baṭṭa. | 70 marks |
| (b) Select systems of Sarvadarśanasamgraha ..         | 30 marks |

**Paper VII.**

- |  |           |
|--|-----------|
| Praśastapāda's Padārthadharmaśamgraha with Nyūyakandali and Vaiśeṣikasūtra with Jayanārayana's Vṛitti. | 100 marks |
|--|-----------|

**Paper VIII.**

- |  |          |
|--|----------|
| (a) Select portions of Nyāyakusumāñjali and Siddhāntalakṣaṇa with the Commentary Mādhuri.              | 70 marks |
| (b) Translation from Sanskrit Unseens into English or from English into Sanskrit or Essay in Sanskrit. | 30 marks |

GROUP G—(*General Philosophy*)**Paper V.**

- |   |          |
|---|----------|
| (a) Sāṅkhyakārikā with Sāṅkhyatattvakaumudī ; Yogasūtras of Patañjali with Vyāsabhāṣya. | 70 marks |
| (b) A Critical Survey of general Sanskrit Philosophy.                                   | 30 marks |

*Paper VI.*

- |  |          |
|--|----------|
| (a) Select portions of Nyāyasūtras of Gautama with Vātsāyana-bhāṣya. | 50 marks |
| (b) Selections from Praśastapāda's Padārthadharma-saṃgraha.          | 50 marks |

*Paper VII.*

- |  |          |
|--|----------|
| (a) Select portions of Vedāntaparibhāṣa and Brahmasūtra with Saṅkara's Commentary. | 50 marks |
| (b) Mīmāṃsānyāyaprakāśa of Āpadeva ..  | 50 marks |

*Paper VIII.*

- |  |          |
|--|----------|
| (a) Select texts of Buddhist and Jaina Philosophy  | 70 marks |
| (b) Translation from Sanskrit Unseens into English or from English into Sanskrit or Essay in Sanskrit. | 30 marks |

GROUP H—(*Prākṛit*)*Paper V.*

- |   |          |
|---|----------|
| (a) Oldest Prākṛit Texts—Select Aśoka and other early Inscriptions. | 50 marks |
| (b) Pāli Texts ..   | 25 marks |
| (c) Buddhist Sanskrit Texts ..                                      | 25 marks |

*Paper VI.*

- |  |            |
|--|------------|
| (a) Prākṛit Texts—                           |            |
| (i) Jaina Canonical Texts                    | } 70 marks |
| (ii) Prākṛit Texts in Sanskrit Dramas        |            |
| (iii) Prākṛit Drama                          |            |
| (b) Critical Survey of Prākṛit Literature .. | 30 marks   |

*Paper VII.*

- |  |          |
|--|----------|
| (a) Prākṛit Prose and Poetry and Apabhraṃśa Texts. | 70 marks |
| (b) Prākṛit Philology ..                           | 30 marks |

*Paper VIII.*

- |  |          |
|--|----------|
| (a) Prākṛit Grammar and Prosody ..   | 50 marks |
| (b) Pāli Grammar ..  | 20 marks |
| (c) Translation from Sanskrit or Prākṛit Unseens into English or from English into Sanskrit (or Prākṛit) or Essay in Sanskrit. | 30 marks |

GROUP I—(*Epigraphy and History*)*Paper V.*

- |  |          |
|--|----------|
| (a) Select Prākṛit Inscriptions with special reference to the Maurya period. | 70 marks |
| (b) Early Indian Alphabet ..   | 30 marks |



*Paper VI.*

- |   |          |
|---|----------|
| (a) Select Prākṛit Inscriptions with special reference to Eastern India.                        | 70 marks |
| (b) Development of Modern Indian Alphabets with special study of the Bengali and Nagri Scripts. | 30 marks |

*N. B.*—All Inscriptions should be studied critically with reference to their language, matter and historical bearing.

*Paper VII.*

- |  |           |
|--|-----------|
| Select Texts from Sanskrit Literature on History and Polity. | 100 marks |
|--|-----------|

*Paper VIII.*

- |  |          |
|--|----------|
| (a) Ancient Geography of India with special reference to original texts.                               | 40 marks |
| (b) Select Texts from the Literature on Ancient Art and Iconography.                                   | 30 marks |
| (c) Translation from Sanskrit Unseens into English or from English into Sanskrit or Essay in Sanskrit. | 30 marks |

GROUP J—(*Vaiṣṇavism*)*Paper V.*

- |  |            |
|--|------------|
| Select Vedic Hymns on Viṣṇu and select texts from Upaniṣads and Epics. | } 70 marks |
| Select portions of the Siddhitrāya of Yamunā-cārya.                    |            |
| Select portions of the Śribhāṣya                                       |            |
| Select portions of the Nyāyapariśūddhi                                 |            |
| Select portions of the Tattvamuktākālāpa                               | } 30 marks |
| A Critical Survey of Vaiṣṇava Literature                               |            |

*Paper VI.*

- |   |             |
|---|-------------|
| Mādhvasiddhāntasūtra                                | } 100 marks |
| Select portions of Tātparyaprakāśa of Vyāsa-tīrtha. |             |
| Pramāṇapaddhati                                     |             |
| Select portions of Nyāyāmṛta                        |             |
| Bhaktirasāyana of Madhūsudana Sarasvatī             |             |

**Paper VII.**

Laghu-bhāgavatāmṛta

Select Sandarbhas of Saṭsandarbha with  
Sarvasaṃvādinī.Select portions of Govinda-bhāṣya and  
Prameyaratnamālā.

Select portions of Ujjvalanīlamāṇi

Select portions of Bhāgavata with Toṣaṇi

Select portions of Viṣṇupurāṇa

Select portions of Chaitanyacharitāmṛta of

Select portions of Bhaktirasāmṛtasindhu  
Kṛṣṇadāsa Kavirāja.

} 100 marks

**Paper VIII.**(a) Select portions of Vallabha's Bhāṣya on  
Brahmasūtras; Select portions of Nim-  
bārka's Bhāṣya with Srinivāsa's Com-  
mentary; Select portions of Ahirbudh-  
nyāsaṃhitā and Jayakhyasaṃhitā;  
Brahmasaṃhitā as in Bhaktivinoda's  
edition; Vidvanmaṇḍana; Vedāntaratnā-  
mañjūṣa.

70 marks

(b) Translation from Sanskrit Unseens into  
English or from English into Sanskrit  
or Essay in Sanskrit.

30 marks

## GROUP K—(Smṛti)

**Paper V.**(a) Pāraskara Grhyasūtra or Gobhila Grhya-  
sūtra; Bodhayana's Dharmasūtra; Āpas-  
tamba's Dharmasūtra or Gautama's  
Dharmasūtra; Select portions of Parā-  
śarasamṛiti with Mādhava.

70 marks

(b) A Critical Survey of Smṛti Literature

.. 30 marks

**Paper VI.**Select portions of Yājñavalkya with Mitākṣarā;  
Jimūtavāhana's Dāyabhāga with Select  
portions of Śrīkṛṣṇa Tarkālankāra's  
Commentary; Select portions of Manu  
with Mēdhātithi's Bhāṣya; Select portions  
from Hemādri.

100 marks

**Paper VII.**Select portions of Malamāsatattva, Udvāha-  
tattva and Nirṇayasindhu; Select portions  
of Śrāddhaviveka, Ekādaśitattva and  
Dattakamimāṃsā.

100 marks

**Paper VIII.**

- (a) Select portions of Jaiminiyanyāyamālāvis- 70 marks  
tara ; Nyāyaprakāśa.
- (b) Translation from Sanskrit Unseens into 30 marks  
English or from English into Sanskrit  
or Essay in Sanskrit.

## GROUP L—(Jainism)

**Paper V.**

- (a) Select portions from three of the Canonical 70 marks  
Aṅgas with Commentary and Prākṛit  
Grammar with special reference to  
Ardhamagadhī.
- (b) A Critical Survey of Jaina Literature .. 30 marks

**Paper VI.**

- Tattvārthādhigamastūra with Vṛtti; Select 100 marks  
portions of Tattvārthaśloka-vārttika;  
Dravyasaṃgraha of Nemicandra; Jai-  
natarkavārttika with the Commentary  
of Śāntyācārya; Pravacanasāra of  
Kundakundacārya.

**Paper VII.**

- Select portions of Prāmāṇyanāyatattvālokā- 100 marks  
lāṅkāra of Devasūri; Select portions of  
Pramāṇamīmāṃsā and Syādvādamāñ-  
jari of Malliṣeṇa; Select portions of  
Aṣṭasāhaśrī of Vidyānandi.

**Paper VIII.**

- (a) Parikṣmukhasūtravṛtti of Anantavīrya; 70 marks  
Select portions of Prameyakamalamār-  
taṇḍa; Saddarśanasamuccaya with  
Guṇaratna's Tikā.
- (b) Translation from Sanskrit Unseens into 30 marks  
English or from English into Sanskrit  
or Essay in Sanskrit.

## GROUP M—(Saivism and Tāntricism)

**Paper V.**

- (a) Rudrādhyāya, Devisūkta and Durgāsaptasatī 70 marks  
(in Markaṇḍeya-purāṇa); Select portions  
of Brahmasūtra with Śrīkaṇṭhabhāṣya  
and Sīvārkamaṇidīpikā; Virasaivacin-  
tāmaṇi; Select portions of Śrīkarabhāṣya.

- (b) A Critical Survey of the Śaiva and Tantra Literature. 30 marks

*Paper VI.*

- Spandapradīpikā ; Select portions of Tantrāloka ; 100 marks  
 Pratyabhijñā-vimarśinī ; Parātrīpikā ;  
 Sivasūtravimarśinī ; Mahārthamañjari  
 with Parimala.

*Paper VII.*

- Sādhnamālā ; Advayavajrasaṃgraha ; Prajñopāyavinīścayasiddhi ; Jñānasiddhi ; Pañcakrama ; Select portions of Śaktisāṅgama Tantra ; Select portions of Āryamañjūśrīmulakalpa ; Vīṃśikā and Trīṃśikā with Sthīrmatī's Commentary. 100 marks

*Paper VIII.*

- (a) Satcakranirūpaṇa with Commentary ; Select portions of Śāradātīlaka ; Select systems of Sarvadarśanasamgraha ; Select portions of Tantrasāra ; Vedantasāra and Śāṅkhyatattvakaumudī ; Varivasyū-Bhāṣya ; Nityaṣoḍaśīkāṇḍa with Bhāskararāya's Commentary. 70 marks  
 (b) Translation from Sanskrit Unseen into English or from English into Sanskrit or Essay in Sanskrit. 30 marks

GROUP N—(Mixed Group)

*Paper V.*

- (a) Selections from Kāvya texts ; Select Drama texts. 70 marks  
 (b) A Critical Survey of Sanskrit Literature .. 30 marks

*Paper VI.*

- (a) Mammata's Kāvyaśrī 50 marks  
 (b) Vararuci's Prakṛtaprakāśa ; Karpūramañjari ; Select Inscriptions of Aśoka. 50 marks

*Paper VII.*

- (a) Brahmasūtra-Catuhśūtri with Śāṅkarabhāṣya ; Brahmasūtra—1st and 2nd pādas of the 2nd Adhyāya ; Select portions of Brhadāraṇyaka or Chāndogya Upaniṣad with Śāṅkarabhāṣya. 50 marks  
 (b) Select portions of Nyāyasūtra with Viśvānāthavṛtti ; Śāṅkhyatattvakaumudī. 50 marks

**Paper VIII.**

- (a) *Vijñaptimātratāsiddhi*; *Tattvārthādhigama-sūtra* with *Vṛtti*. *Tarkapāda* of *Sāstradīpikā*. 70 marks
- (b) Translation from Sanskrit Unseens into English or from English into Sanskrit or Essay in Sanskrit. 30 marks

Questions on prescribed texts (except on Grammar and Poetics) in the compulsory papers as also in every Group may include—

(i) Questions on the subject-matter and on the language of the set books.

(ii) Passages for discussion in simple Sanskrit, taken from standard Sanskrit Commentaries on the texts.

In Groups C, D, E, F and G, the questions on the prescribed texts shall also include alternative questions on philosophical topics for discussion in English (or in simple Sanskrit at the option of the candidate); in answering such questions, candidates will be expected to be able to state the views of the school taken up and controvert the views of the other schools.

The first paper shall include questions on the History of Vedic Literature, and the History of Philosophy and Religion during the Vedic period.

The second paper, in Group A the seventh paper and in Group H the eighth paper, shall include questions on the Practical application of the rules of Grammar.

The fifth paper in Group A shall include questions framed with a view to testing the ability of candidates to apply the rules of rhetoric to passages from the prescribed texts.

Passages set for translation from English into Sanskrit shall be translated into Classical (and not Vedic) Sanskrit.

The Syndicate shall, upon the recommendation of the Board of Studies concerned, have power to add to or modify the list of specified books from time to time and to select the texts in accordance with the syllabus, and may also recommend books or specify editions to indicate more fully the extent and standard of knowledge required in any paper.

## PALI

1. The M.A. course in Pali shall comprise the following five groups :—

- A. Literature.
- B. Philosophy and Religion.
- C. Epigraphy and History.
- D. Mahayana Literature and Philosophy.
- E. Art and Iconography.

2. There shall be eight papers, each carrying 100 marks. The papers shall be distributed as follows :—

(i) *Compulsory*—

*Paper I.*—Select portions of Buddhist Sutras (Pali and Sanskrit) with or without commentaries.

*Paper II.*—Select portions of the Vinaya and ecclesiastical chronicles.

*Paper III.*—Select portions of the Buddhist Philosophical works (Pali and Sanskrit).

*Paper IV.*—Language and Literature.

*Paper V.*—History and Geography (with special reference to the original texts).

(ii) *Special*—

Besides the five Compulsory Papers, candidates will have to select *one* of the following Groups :—

GROUP A—(*Literature*)

*Paper VI.*—Special Jatakas and Avadanas and the select texts of Folk Literature.

*Paper VII.*—Select poetical pieces and extra-canonical texts (Prose and Poetry).

*Paper VIII.*—Comparative study of allied Indian Literature and Essay.

GROUP B—(*Philosophy and Religion*)

*Paper VI.*—Special Philosophical texts from Pali Literature.

*Paper VII.*—Special Philosophical texts from Buddhist Sanskrit Literature and other Sanskrit texts dealing with Buddhist Philosophy.

*Paper VIII.*—Comparative studies in Indian Philosophy and Essay.

GROUP C—(*Epigraphy and History*)

*Paper VI.*—Special Buddhist Historical texts, Archaeological reports and Records of Buddhist pilgrims.

*Paper VII.*—Select Prakrit Inscriptions.

*Paper VIII.*—Select Sanskrit Inscriptions and Essay.

GROUP D—(*Mahayana Literature and Philosophy*)

*Paper VI.*—Select Sanskrit Sutras and Poetical works.

*Paper VII.*—Special Philosophical and Tantra Texts.

*Paper VIII.*—Buddhism outside India and Essay.

GROUP E—(*Art and Iconography*)

*Paper VI.*—Select Buddhist and other Indian texts dealing with Architecture, Sculpture and Painting.

*Paper VII.*—Select Buddhist Monuments, Reliefs, Images and Frescoes.

*Paper VIII.*—Buddhist Art in its origin and development in and outside India and Essay.

3. Students shall be expected to be able to read Buddhist texts in Sinhalese, Siamese and Burmese characters.

## ARABIC

1. The M.A. course in Arabic shall be divided into six groups.

2. The first four papers of all the groups shall be identical and shall cover the following subjects :—

*Paper I.*—History of Islam in Arabia and Persia 100 marks  
and in Mediterranean countries.

*Paper II.*—(i) History of the Arabic Language 30 marks

The course in the History of the Arabic Language includes the following topics :—

Classification of Languages—the General  
Characteristics of the Semitic Family  
of Speech—The Grouping of the Semitic  
Languages—Elements of the History  
of the Sounds and Inflexions of Arabic  
in the Pre-Islamic and Classical Periods.

(ii) History of Arabic Literature .. 70 marks

*Paper III.*—(i) Arabic Grammar .. 30 marks

(ii) Rhetoric and Prosody .. 30 marks

(iii) Translation of Unseen passages 40 marks  
from Arabic into English and  
*vice versa*.

*Paper IV.*—(i) Modern Arabic.

(a) Prose, and } 50 marks  
(b) Poetry }

(ii) Essay on a subject connected with 50 marks  
the compulsory papers.

3. The remaining papers shall be taken from one of the following groups :—

GROUP A—(*Literature*)

*Paper V.*—Text—Pre-Islamic Poetry .. 100 marks

*Paper VI.*—Text—Post-Islamic Poetry .. 100 marks

*Paper VII.*—Text—Literary Criticism .. 100 marks

*Paper VIII.*—Text—Prose .. 100 marks

(i) Rhymed

(ii) Unrhymed.

GROUP B—(*History*)

<i>Paper V.</i>	Philosophy of History	..	100 marks
<i>Paper VI.</i>	Early Caliphate, Umayyads and Abbasides.		100 marks
<i>Paper VII.</i>	Muslims in Spain	..	100 marks
<i>Paper VIII.</i>	A special period in the history of Islam to be prescribed every year by the Board.		100 marks

GROUP C—(*The Quran and the Taffsir*)

<i>Paper V.</i>	Text from the Quran	..	100 marks
	(i) Sura Maida		
	(ii) Sura Yusuf		
	(iii) Sura Najm.		
<i>Paper VI.</i>	Text—Taffsir al-Baydawi-Sura Ali Imran.		100 marks
<i>Paper VII.</i>	Quranic Sciences	..	100 marks
<i>Paper VIII.</i>	History of the Interpretation of the Quran.		100 marks

GROUP D—(*Hadith*)

<i>Paper V.</i>	Text	..	100 marks
<i>Paper VI.</i>	Text	..	100 marks
<i>Paper VII.</i>	Usul-i-Hadith including the Maudu'at.		100 marks
<i>Paper VIII.</i>	The History of the Development of the Science of Hadith.		100 marks

GROUP E—(*Ilmu'l Kalam and Philosophy*)

<i>Paper V.</i>	Al-Falsafatul-Ishraqiya	..	100 marks
<i>Paper VI.</i>	Al-Falsafatul-Mashshya	..	100 marks
<i>Paper VII.</i>	Ilmu'l-Kalam	..	100 marks
<i>Paper VIII.</i>	History of Muslim Philosophy and Ilmu'l-Kalam.		100 marks

GROUP F—(*Philology and Grammar*)

Only such students will be allowed to take up this Group as have passed the B.A. Examination with Honours in Arabic or any other examination equivalent to it or the M.A. Examination in any other Group in Arabic.

<i>Paper V.</i>	(i) Arabic Grammar	..	50 marks
	(ii) Linguistic theories of the Arab Grammarians.		50 marks



*Paper VI.*—(i) General Principles of Linguistic Development including Phonetics } 100 marks  
 (ii) Elements of Arabic Palaeography }

*Paper VII.*—(a) Hebrew .. 50 marks

(b) Syriac .. 50 marks

*Paper VIII.*—Comparative Philology of the Semitic languages 100 marks

4. A candidate who has passed the B.A. Examination with Honours in Arabic or the Madrassa Senior Certificate Examination or any other examination equivalent to it may, subject to the conditions specified below, offer a thesis on a subject connected with the Special Group chosen for study, instead of Papers III and IV. The thesis may be written in Arabic or in English.

5. The conditions to be fulfilled by a candidate who is allowed to offer a thesis are as follows :—

(a) He must have completed one year's study of the M.A. course in Arabic under University Lecturers or in a College affiliated in Arabic up to the M.A. standard.

(b) He must, at the end of the year, submit to the Board of Higher Studies in Arabic and Persian an application for permission to offer a thesis in lieu of part of the examination.

(c) The applicant shall indicate the subject and scope of the thesis he wishes to offer and must be recommended by the Professor or Professors under whom he has been working.

(d) If the application be granted by the Board of Higher Studies in Arabic and Persian, the thesis must be prepared under the general direction of the Professor or Professors with whom the candidate is prosecuting his studies.

(e) The candidate shall deliver three copies of the thesis (printed or type-written) to the Secretary to the Council of Post-Graduate Teaching in Arts, at least one month before the first day of the M.A. Examination at which he intends to present himself.

(f) The thesis shall be examined by a Board of three Examiners and the maximum number of marks assigned to the thesis shall be 200. The Examiners may, at their discretion, subject the candidate to a *viva voce* examination on the subject of the thesis.

(g) The name of a candidate whose thesis has been approved shall be marked with an asterisk in the list of successful candidates published in the *Gazette* and also in the *University Calendar*.

6. The limits of the subjects shall be defined and books shall be prescribed and recommended from time to time by the Board of Higher Studies concerned.

## PERSIAN

1. The M.A. course in Persian shall be divided into five groups.

2. The first four papers of all the groups shall be identical and shall cover the following subjects :—

*Paper I.*—(i) General History of Pre-Islamic and Post-Islamic Persia. 70 marks

(ii) General History of Islamic India. 30 marks

*Paper II.*—History of Persian Literature .. 100 marks

*Paper III.*—(i) Philology .. 30 marks

The course in Persian Philology includes the following topics :—

Classification of Languages—the Indo-European Family of Languages—the Aryan or Indo-Iranian branch—the Classification of the Iranian Speeches—History of Iranian in its sounds and inflexions in the Old Iranian, Middle Iranian and New Iranian Periods (through the Persian language).

(ii) Rhetoric and Prosody .. 30 marks

(iii) Unseen .. 40 marks

*Paper IV.*—(i) Modern Persian :

(a) Poetry } .. 50 mark

(b) Prose }

(ii) Essay on a subject connected with compulsory papers. 50 marks

3. The remaining papers shall be taken from one of the following groups :—

## GROUP A—(Literature)

*Paper V.*—Text—Poetry (i) Ghazal .. 70 marks

(ii) Rubai .. 30 marks

*Paper VI.*—Text—Poetry (i) Qasida .. 50 marks

(ii) Mathnawi .. 50 marks

*Paper VII.*—Text—Prose (ornate) .. 100 marks

*Paper VIII.*—Text—Prose (simple) ... 100 marks

## GROUP B—(Historical Literature) (Persian)

*Paper V.*—Text—Historical Poetry .. 100 marks

*Paper VI.*—Text—Prose—Tahiride and Ghaznawide periods. .. 100 marks

*Paper VII.*—Text—Prose—Saljuq and Tatar periods. 100 marks

*Paper VIII.*—Text—Prose—Safawide and Qachar periods. 100 marks

GROUP C—(*Historical Literature*) (*Indian*)

<i>Paper V.</i> —Text—Historical Poetry	..	100 marks
<i>Paper VI.</i> —Text—Prose—Pre-Moghal period	..	100 marks
<i>Paper VII.</i> —Text—Prose—Moghal period (Baber-Akbar).	100 marks	
<i>Paper VIII.</i> —Text—Prose—Moghal period (Jehangir and Shah Jahan).	100 marks	

GROUP D—(*Mysticism*)

<i>Paper V.</i> —Text—Mystical Poetry	..	100 marks
<i>Paper VI.</i> —Text—Prose	..	100 marks
<i>Paper VII.</i> —Philosophy of Mysticism	..	100 marks
<i>Paper VIII.</i> —History of Mysticism	..	100 marks

GROUP E—(*Philology*)

<i>Paper V.</i>		
(a) General Principles of Linguistics	}	.. 100 marks
(b) History of the Persian Script		
<i>Paper VI.</i>		
Text		
(a) Avesta		
(b) Old Persian (including elements of Grammar)	}	... 100 marks
<i>Paper VII.</i>		
(a) Pahlavi Text (including elements of Grammar)	}	... 100 marks
(b) Semitic Influence on Persian Language		
<i>Paper VIII.</i>		
(a) Historical Grammar of the Iranian Languages		50 marks
(b) Sanskrit		.. 50 marks

Only such students will be permitted to take up this Group as have passed the R.A. Examination with Honours in Persian or M.A. Examination in any other Group in Persian.

4. A candidate who has taken his B.A. Degree with Honours in Persian may, subject to the conditions specified below, offer a thesis connected with some department of the subject in lieu of examination in two papers. If the candidate has taken up Group B or C the thesis will be allowed to be substituted for Papers I and IV. If the candidate has taken up Group A, D or E, the thesis will be allowed to be substituted for Papers III and IV. The thesis may be written in Persian or in English.

5. The conditions to be fulfilled by a candidate who is allowed to offer a thesis are as follows :—

(a) He must have completed one year's study of the M.A. course in Persian under University Lecturers or in a College affiliated in Persian up to the M.A. standard.

(b) He must, at the end of the year, submit to the Board of Higher Studies in Arabic and Persian an application for permission to offer a thesis in lieu of part of the examination.

(c) The applicant shall indicate the subject and scope of the thesis he wishes to offer and must be recommended by the Professor or Professors under whom he has been working.

(d) If the application be granted by the Board of Higher Studies in Arabic and Persian, the thesis must be prepared under the general direction of the Professor or Professors with whom the candidate is prosecuting his studies.

(e) The candidate shall deliver three copies of the thesis (printed or type-written) to the Secretary to the Council of Post-Graduate Teaching in Arts at least one month before the first day of the M.A. Examination at which he intends to present himself.

(f) The thesis shall be examined by a Board of three Examiners and the maximum number of marks assigned to the thesis shall be 200. The Examiners may, at their discretion, subject the candidate to a *viva voce* examination on the subject of the thesis.

(g) The name of the candidate whose thesis has been approved shall be marked with an asterisk in the list of successful candidates published in the *Gazette* and also in the *University Calendar*.

6. The limits of subjects shall be defined and books shall be prescribed and recommended from time to time by the Board of Higher Studies concerned.

## HEBREW

The course shall include—

*Paper I.*—Passages from one of the books of the Hexateuch for translation, criticism and exegesis. . . 75 marks

English passage (s) for translation into Hebrew . . . 25 marks

*Paper II.*—Passages from one or more of the Prophetical Books for translation, criticism and exegesis . . . 75 marks

English passage (s) for translation into Hebrew . . . 25 marks

*Paper III.*—Passages from the Old Testament Poetical Books for translation, criticism and exegesis. . . 100 marks

*Paper IV.*—Unseen passages from the Old Testament 100 marks

*Paper V.*—*Either* (A) Passages for translation into English from prescribed post-Biblical books with questions arising out of the subject-matter of the texts . . . 100 marks

Or (B) Passages for translation into English from specified books in Syriac, including always a portion of the Peshitto version of the New Testament, together with questions on the language and subject-matter of the passages set.

*Paper VI.*—History of Jewish Religion and Civilisation from the earliest times to the destruction of Jerusalem (A.D. 70). .. 100 marks

*Paper VII.*—History and contents of Hebrew Literature, Biblical and post-Biblical. .. 100 marks

*Paper VIII.*—Essay on a subject connected with the course. .. 100 marks

Papers I, II and III shall include questions on Grammar and Philology.

### SYRIAC

1. The course in Syriac shall comprise—

#### *Paper I*

The General History of Syriac Literature .. 100 marks

#### *Paper II*

Prescribed Poetical Texts .. 100 marks

#### *Paper III*

Prescribed texts dealing with Martyrology .. 100 marks

#### *Paper IV*

Prescribed Biblical texts .. 100 marks

#### *Paper V*

Texts specially prescribed for their Philological matter. 100 marks

#### *Paper VI*

Prescribed Historical texts .. 100 marks

#### *Paper VII*

Prescribed Ritualistic texts .. 100 marks

#### *Paper VIII*

Syntax and Essay .. 100 marks

2. The course shall include prescribed texts in Prose and Poetry and the outlines of Syriac Literature and Language and Comparative Semitic Philology.

The Syndicate, on the recommendation of the Board of Higher Studies concerned, shall, from time to time, prescribe such text-books as may seem to them desirable, and define the scope of the subject of each paper. The Syndicate may also, on the recommendation of the Board of Higher Studies, modify the distribution of marks in such manner as may seem desirable.

## 3. Questions on the prescribed texts shall include—

(i) Passages for translation into English, not carrying more than 25 marks in any one paper.

(ii) Questions on the subject-matter and language of the passages set.

## GREEK

The course shall include—

*Paper I*

- |  |          |
|--|----------|
| (a) Passages from prescribed Prose texts ..                      | 70 marks |
| (b) Unseen passages of Greek Prose for translation into English. | 30 marks |

*Paper II*

- |   |          |
|---|----------|
| (a) Passages from prescribed Poetry texts ..                      | 70 marks |
| (b) Unseen passages of Greek Poetry for translation into English. | 30 marks |

*Paper III*

- |   |          |
|---|----------|
| (a) Passages from prescribed Greek Plays ..                                 | 70 marks |
| (b) Unseen passages from the Greek Dramatists for translation into English. | 30 marks |

*Paper IV*

- |   |           |
|---|-----------|
| Passages in English for translation into Greek Prose. | 100 marks |
|---|-----------|

*Paper V*

- |  |           |
|--|-----------|
| The Philology of the Greek tongue and the elements of Comparative Philology. | 100 marks |
|--|-----------|

*Paper VI*

- |   |           |
|---|-----------|
| The General History and Antiquities of Greece | 100 marks |
|---|-----------|

*Paper VII*

- |                                |           |
|--------------------------------|-----------|
| History of Greek Literature .. | 100 marks |
|--------------------------------|-----------|

*Paper VIII*

- |   |           |
|---|-----------|
| Essay on some subject connected with the course | 100 marks |
|---|-----------|

In Papers I, II and III the questions on prescribed texts shall include—

(i) Passages for translation into English, which shall not carry more than 25 marks in any one paper.

(ii) Questions on the subject-matter and language of the texts.

## LATIN

The course shall include—

*Paper I*

Passages from prescribed Poetry texts.

*Paper II*

Passages from prescribed Prose texts.

*Paper III*

Unseen passages from Latin authors for translation into English.

*Paper IV*

Passages in English for translation into Latin Prose.

*Paper V*

The Philology of the Latin tongue and the elements of Comparative Philology.

*Paper VI*

The General History and Antiquities of Rome.

*Paper VII*

History of Classical Latin Literature.

*Paper VIII*

Essay on some subject connected with the course.

In Papers I and II the questions on the prescribed texts shall include—

(i) Passages for translation into English, which shall not carry more than 25 marks in any one paper.

(ii) Questions on the subject-matter and language of the texts.

## FRENCH

The course shall include—

*Paper I*—General History of French Literature.

*Paper II*—Drama.

*Paper III*—Poetry.

*Paper IV*—Prose.

*Paper V*—Historical Grammar of the French Language.

*Paper VI*—Essay (to be written in French).

GROUP A—(*Literary*)

*Paper VII*—Any one of the following periods :—

- (a) From the 14th to the 16th Century (from the Middle Ages to the Renaissance).
- (b) The 17th Century (The Classical Movement).
- (c) From the 18th Century down to the French Revolution.

*Paper VIII*—Any one of the following periods :—

- (a) The Romantic Movement.
- (b) From 1800 to 1870.
- (c) From 1870 to 1914.
- (d) From 1914 down to the present day.

GROUP B—(*Linguistics*)

*Paper VII* } —Two out of the three following courses :—  
*Paper VIII* }

- (a) Development of the French Speech out of Latin through Folk Latin (Vulgar Latin) with elements of Latin (studied through Grammar and simple Texts in Prose and Verse) and General Linguistics of the Romanic Languages.
- (b) Development of French from Old French onwards (studied through Texts of Old, Middle and Early Modern French).
- (c) Evolution of French Poetical forms.

## GERMAN

The course shall include—

*Paper I*—General History of German Literature.

*Paper II*—Drama.

*Paper III*—Poetry.

*Paper IV*—Prose.

*Paper V*—Historical Grammar of the German Language.

*Paper VI*—Essay (to be written in German).

GROUP A—(*Literary*)

*Paper VII*—Any one of the following periods :—

- (a) From 1500 to 1700.
- (b) From 1700 to 1760.

*Paper VIII*—Any one of the following periods :—

- (a) From 1760 to 1830.
- (b) From 1830 to 1914.
- (c) From 1914 down to the present day.



GROUP B—(*Linguistics*)

*Paper VII*—Germanic Linguistics (with special reference to the origin of High German) and Gothic (studied in Grammar and Texts).

*Paper VIII*—Development of German from the earliest times to the present day (studied through Texts of Old, Middle and Modern German).

## MODERN INDIAN LANGUAGE

1. Candidates will be examined in a Modern Indian Language as principal subject to be selected from a list prescribed from time to time by the Executive Committee on the recommendation of the Board of Higher Studies in Modern Indian Language.

2. The list shall include the following languages for the time being :—

- (i) Bengali.
- (ii) Assamese.
- (iii) Oriya.
- (iv) Hindi.
- (v) Urdu.

3. The course in Modern Indian Language shall be as follows :—

## I. BENGALI

*Paper I.*

History of Literature	..	..	100 marks
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*Paper II.*

Poetry Texts	..	..	70 marks
Unseen	..	..	30 marks

*Paper III.*

Prose Texts	..	..	70 marks
Principles of Criticism	..	..	30 marks

*Paper IV.*

Drama	..	..	70 marks
Essay	..	..	30 marks

*Paper V.*

A special period of literature before 1800	..	..	100 marks
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*Paper VI.*

A special period of literature after 1800	..	..	100 marks
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*Paper VII.*

<i>Either</i> , Sanskrit (not for those who had Sanskrit for their B.A. Examination).	100 marks
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*Or*, one Modern Indo-Aryan Language :—Assamese, Oriya, Hindi, Urdu. (The list may be added to by the Executive Committee from time to time.)

*Paper VIII.*

- |  |          |
|--|----------|
| (a) Historical and Comparative Grammar of Bengali. | 50 marks |
| (b) Elementary Middle Indo-Aryan texts ..          | 50 marks |

## II. ASSAMESE

*Paper I.*

- |                          |           |
|--------------------------|-----------|
| History of Literature .. | 100 marks |
|--------------------------|-----------|

*Paper II.*

- |                 |          |
|-----------------|----------|
| Poetry Texts .. | 70 marks |
| Unseens ..      | 30 marks |

*Paper III.*

- |                            |          |
|----------------------------|----------|
| Prose Texts ..             | 70 marks |
| Principles of Criticism .. | 30 marks |

*Paper IV.*

- |          |          |
|----------|----------|
| Drama .. | 70 marks |
| Essay .. | 30 marks |

*Paper V.*

- |   |           |
|---|-----------|
| A special period of literature before 1800 .. | 100 marks |
|---|-----------|

*Paper VI.*

- |  |           |
|--|-----------|
| A special period of literature after 1800 .. | 100 marks |
|--|-----------|

*Paper VII.*

- |   |           |
|---|-----------|
| <i>Either</i> , Sanskrit (not for those who had Sanskrit for their B.A. Examination). | 100 marks |
|---|-----------|

*Or*, one Modern Indo-Aryan Language :—Bengali, Oriya, Hindi, Urdu. (The list may be added to by the Executive Committee from time to time.)

*Paper VIII.*

- |   |          |
|---|----------|
| (a) Historical and Comparative Grammar of Assamese. | 50 marks |
| (b) Elementary Middle Indo-Aryan texts ..           | 50 marks |

## III. ORIYA

*Paper I.*

- |                          |           |
|--------------------------|-----------|
| History of Literature .. | 100 marks |
|--------------------------|-----------|

*Paper II.*

- |                 |          |
|-----------------|----------|
| Poetry Texts .. | 70 marks |
| Unseens ..      | 30 marks |

*Paper III.*

- |                            |          |
|----------------------------|----------|
| Prose Texts ..             | 70 marks |
| Principles of Criticism .. | 30 marks |

*Paper IV.*

- |          |          |
|----------|----------|
| Drama .. | 70 marks |
| Essay .. | 30 marks |

*Paper V.*

- |   |           |
|---|-----------|
| A special period of literature before 1800 .. | 100 marks |
|---|-----------|

**Paper VI.**

A special period of literature after 1800 .. 100 marks

**Paper VII.**

*Either*, Sanskrit (not for those who had Sanskrit for their B.A. Examination). 100 marks

*Or*, one Modern Indo-Aryan Language :—Bengali, Assamese, Hindi, Urdu. (The list may be added to by the Executive Committee from time to time.)

**Paper VIII.**

(a) Historical and Comparative Grammar of Oriya. 50 marks

(b) Elementary Middle Indo-Aryan texts .. 50 marks

## IV. HINDI

**Paper I.**

History of Literature .. 100 marks

**Paper II.**

Poetry Texts .. 70 marks

Unseens .. 30 marks

**Paper III.**

Prose Texts .. 70 marks

Principles of Criticism .. 30 marks

**Paper IV.**

Drama .. 70 marks

Essay .. 30 marks

**Paper V.**

A special period of literature before 1800 .. 100 marks

**Paper VI.**

A special period of literature after 1800 .. 100 marks

**Paper VII.**

*Either*, Sanskrit (not for those who had Sanskrit for their B.A. Examination). 100 marks

*Or*, one Modern Indo-Aryan Language :—Bengali, Assamese, Oriya, Urdu. (The list may be added to by the Executive Committee from time to time.)

**Paper VIII.**

(a) Historical and Comparative Grammar of Hindi. 50 marks

(b) Elementary Middle Indo-Aryan texts .. 50 marks

## V. URDU

**Paper I.**

History of Literature .. 100 marks

**Paper II.**

Poetry Texts .. 70 marks

Unseens .. 30 marks

*Paper III.*

Prose Texts	..	..	70 marks
Principles of Criticism	..	..	30 marks

*Paper IV.*

Drama, Unseens and Essay	..	..	100 marks
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*Paper V.*

A special period of literature before 1800	..	..	100 marks
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*Paper VI.*

A special period of literature after 1800	..	..	100 marks
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*Paper VII.*

<i>Either</i> , Persian (not for those who had Persian for their B.A. Examination).	100 marks
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*Or*, one Modern Indo-Aryan Language :—Bengali, Assamese, Oriya, Hindi. (The list may be added to by the Executive Committee from time to time.)

*Paper VIII.*

(a) Historical and Comparative Grammar of Urdu.	50 marks
(b) Elementary Middle Indo-Aryan texts	.. 50 marks

GENERAL

Each of the eight Papers shall carry 100 marks.

The scope of the subject included in each paper shall be defined and suitable text-books (including texts in Sanskrit, Persian and Modern Indo-Aryan Languages) and periods of literature recommended from time to time by the Board of Higher Studies in Modern Indian Language.

In Paper IV, the essay to be composed must, in all cases, be in the language of the Principal subject taken up.

In Paper VII, besides the study of the prescribed texts candidates will be expected to possess a fair knowledge of the Grammar of Sanskrit, or Persian, or of the Modern Indo-Aryan Language selected, as well as ability to translate easy passages from and into the language taken up.

In Paper VIII, part (a) shall be devoted to Indo-Aryan or other prescribed branch of Philology. in so far as it elucidates the origin and development of the Principal language taken up; and part (b) shall include questions on easy prescribed texts and simple questions on Grammar.

A candidate who has taken his B.A. Degree with Honours in a language, or has taken his M.A. Degree in a language or in Comparative Philology may, subject to the conditions specified below, offer a thesis connected with some department of the subject in lieu of examination in two papers. If the candidate has taken his M.A. Degree in Comparative Philology, the thesis will be allowed to be submitted in lieu of Papers VII

and VIII. In all other cases the thesis may be submitted in lieu of Papers V and VI.

The conditions to be fulfilled by a candidate who is allowed to offer a thesis are as follows :—

(a) He must have completed one year's study of the M.A. course in Modern Indian Language under University Teachers.

(b) He must, at the end of the year, submit to the Board of Higher Studies in Modern Indian Language an application for permission to offer a thesis in lieu of part of the examination.

(c) The applicant shall indicate the subject and scope of the thesis he wishes to offer and must be recommended by the Professor or Professors under whom he has been working.

(d) If the application be granted by the Board of Higher Studies in Modern Indian Language, the thesis must be prepared under the general direction of the Professor or Professors with whom the candidate is prosecuting his studies.

(e) The candidate shall deliver three copies of the thesis (printed or type-written) to the Secretary to the Councils of Post-Graduate Teaching in Arts and Science at least one month before the first day of the M.A. Examination at which he intends to present himself.

(f) The thesis shall be examined by a Board of three Examiners, and the maximum number of marks assigned to the thesis shall be 200. The Examiners may in their discretion subject the candidate to a *viva voce* examination on the subject of the thesis.

(g) The name of a candidate whose thesis has been approved shall be marked with an asterisk in the list of successful candidates published in the *Gazette* and also in the *University Calendar*.

## COMPARATIVE PHILOLOGY

Eight Papers shall be set as follows :—

### A

Course for the Indo-Aryan Philology

#### *Paper I.*

General Principles of Philology and the Science of Language ; Growth and Change in Language ; Semantics ; Language Types and Classification of Languages ; History of the Science of Grammar and Linguistics in India and in the West.

#### *Paper II.*

Phonetics, the Structure of the Vocal Organs, the Production and the Classification of Speech Sounds, with special reference to the sound system of English and of Bengali (or of the candidate's mother-tongue); Phonetic Script; Linguistic Palaeontology as illustrated in the Indo-European Languages: Outlines of the History of Writing, with special reference to the Scripts of India.

*Paper III.*

Comparative Grammar of Sanskrit (Old Indo-Aryan).

*Paper IV.*

Comparative Grammar of Pali-Prakrit (Middle Indo-Aryan).

*Paper V.*

Comparative and Historical Grammar of Modern Indo-Aryan : Bengali (or the candidate's mother-tongue).

*Paper VI.*

Essays. (Two essays to be chosen out of five given subjects).

*Alternative (a)—Aryan and Indo-European Philology*

*Paper VII.*

(Aryan) Indo-Iranian Philology with Elements of Avesta and Old Persian.

*Paper VIII.*

Indo-European Philology with Elements of Greek.

*Alternative (b)—Philology of the Non-Aryan Languages of India*

*Paper VII.*

Dravidian Philology with Elements of Tamil.

*Paper VIII.*

Kol (Munda) and Tibeto-Burman Philology with Elements either of a Kol speech or of Tibetan.

## B

*Course for Iranian Philology**Paper I.*

General Principles of Philology and the Science of Language ; Growth and Change in Language ; Semantics ; Language Types and Classification of Languages ; History of the Science of Linguistics in the East and in the West.

*Paper II.*

Phonetics, the Structure of Vocal Organs, the Production and the Classification of Speech Sounds with special reference to the sound system of English and of Bengali (or of the candidate's mother-tongue) ; Phonetic Script ; Linguistic Palaeontology as illustrated in the Indo-European Languages ; Outlines of the History of Writing, with special reference to the Scripts of Persia.

*Paper III.*

Avesta and Old Persian (Old Iranian).

*Paper IV.*

Pahlavi and Middle Iranian.

*Paper V.*

Modern Iranian.

*Paper VI.*

Essays. (Two essays to be chosen out of five given subjects.)

**Paper VII.**

Sanskrit and the Elements of Indo-Aryan Philology.

**Paper VIII.**

Arabic with the elements of Semitic Philology : Semitic Influence on the Development of the Persian Language.

A candidate who has taken his B.A. degree with Honours in Linguistics or in a Language, or has taken his M.A. degree in a Language may, subject to the conditions specified below, offer a thesis on any subject included within the scope of paper III or IV or V in lieu of an examination in one of the above papers and Paper VI.

The conditions to be fulfilled by a candidate who is allowed to offer a thesis are as follows :—

(a) He must have completed one year's study of the M.A. course in Comparative Philology under University Teachers.

(b) He must, at the end of the year, submit to the Board of Higher Studies in Comparative Philology an application for permission to offer a thesis in lieu of part of the examination.

(c) The application shall indicate the subject and scope of the thesis he wishes to offer and must be recommended by the Professor or Professors under whom he has been working.

(d) If the application be granted by the Board of Higher Studies in Comparative Philology, the thesis must be prepared under the general direction of the Professor or Professors with whom the candidate is prosecuting his studies.

(e) The candidate shall deliver three copies of the thesis (printed or type-written) to the Secretary to the Council of Post-Graduate Teaching in Arts, at least one month before the first day of the M.A. Examination at which he intends to present himself.

(f) The thesis shall be examined by a Board of three Examiners and the maximum number of marks assigned to the thesis shall be 200. The Examiners may, in their discretion, subject the candidate to a *viva voce* examination on the subject of the thesis.

(g) The name of a candidate whose thesis has been approved shall be marked with an asterisk in the list of successful candidates published in the *Gazette* and also in the *University Calendar*.

## MENTAL AND MORAL PHILOSOPHY

1. The course in Mental and Moral Philosophy shall be as follows :—

**Paper I.**

History of Ancient and Mediaeval European Philosophy.

**Paper II.**

History of Modern European Philosophy.

*Paper III.*

Oriental Philosophy.

*Papers IV and V.*

Theory of Knowledge and Metaphysics.

*Papers VI and VII.*

Any one of the following subjects to be selected by the candidate, two papers being set in each :—

- (i) Psychology, (ii) Logic, (iii) Ethics and Social Philosophy,
- (iv) Philosophy of Religion, (v) Some special branch of Indian Philosophy, (vi) Political Philosophy, (vii) Aesthetics.

*Paper VIII.*

Essay.

2. Questions bearing on General Philosophy and Metaphysics may be included in any paper.

3. The limits of the subjects shall be defined and books shall be recommended from time to time by the Board of Studies concerned.

## HISTORY

1. The course in History shall be as follows :—

*Paper I.*

A selected period of English History.

*Paper II.*

A selected period of Indian History.

*Paper III.*

General History of the Ancient East.

*Paper IV.*

Constitutional History of England.

*Paper V.*

International Law.

*Papers VI and VII.*

Two papers in one of the following subjects to be selected by the candidate :—

- (i) The History of Islam.
- (ii) A special period of Indian History.
- (iii) Economic History of England and India.
- (iv) Comparative Politics.
- (v) A special period of European History, or such other special subjects as may, from time to time, be prescribed by the Syndicate.

*Paper VIII.*

Essay.

2. Books shall be recommended and periods selected by the Board of Studies concerned to indicate the extent and standard of knowledge required.



## ANCIENT INDIAN HISTORY AND CULTURE

Candidates who take up the subject must possess a competent knowledge of Sanskrit so as to be able to refer to the sources in original.

## COMPULSORY PAPERS

1. General History of Vedic and Epic India.
- 2-3. Political History of the Post-Epic Period.
4. Historical Geography of Ancient India.

One of the following groups :—

*(i) Archaeology*

## A

- 5-8. Epigraphy, Palaeography and Numismatics.

## B

- 5-8. Fine Arts, Iconography and Ancient Architecture.

*(ii) Social and Constitutional History*

5. Social life, including manners, customs and ceremonies.
6. Economic life.
7. Administration.
8. Ethnology.

*(iii) Religious History*

5. Vedic Religion.
6. Epic and Pauranik Religions.
7. Buddhism.
8. Jainism.

*(iv) Astronomy and Mathematics*

5. Astronomy.
6. Astronomy.
7. Mathematics.
8. Mathematics.

*(v) Anthropology*

5. Physical Anthropology including origin and antiquity of man.

6. Social Anthropology.
7. Pre-historic Archaeology and Technology.
8. Indian Ethnography.

In each Group a subject for an essay shall be set in one of the papers, which will carry half the value assigned to that paper.

The Board of Higher Studies may, from time to time, vary the alternative groups.

## ISLAMIC HISTORY AND CULTURE

### *(Compulsory Papers)*

#### *Paper I.*

Rise of Islam and the Caliphate (Early Caliphate, Ommayyads or Abbasides—a Special Period to be selected).

#### *Paper II.*

History of Islam in India (the subject is to be studied with reference to original sources including Coins).

#### *Paper III.*

History of Islamic States (Modern).

#### *Paper IV.*

Geography (in relation to the history of Islam).

Any *one* of the following groups :—

### *A. Religious History*

#### *Paper V.*

Islam—its principles and practices.

#### *Paper VI.*

History of Theological Development.

#### *Paper VII.*

Qoran and Hadis—their history and interpretation.

#### *Paper VIII.*

Islamic Philosophy and its Development.

### *B. Islamic Culture and Civilisation*

#### *Paper V.*

Social Institutions.

#### *Paper VI.*

Political Institutions.

#### *Paper VII.*

Fine Arts and Architecture.

#### *Paper VIII.*

Science and Literature.

C. *History of Islam outside India**Paper V.*

Spain and Northern Africa (including Egypt).

*Paper VI.*

Iran and Central Asia.

*Paper VII.*

Turkey.

*Paper VIII.*

Arabia, Syria, Iraq, China and the East Indies.

D. *History of Islam in India**Paper V.*

Bengal (the subject is to be studied with special reference to epigraphic and numismatic sources).

*Paper VI.*

A Province in India other than Bengal.

*Paper VII.*

Special Period of the history of Pre-Mughal India.

*Paper VIII.*

Special Period of the history of Mughal India.

E. *Cultural History of Islam in India**Paper V.*

Public Administration.

*Paper VI.*

Influence on Indian Languages.

*Paper VII.*

Influence on Fine Arts and Architecture.

*Paper VIII.*

Economic and Social History.

F. *Law**Paper V.*

History of Islamic Law in India.

*Paper VI.*

History of Islamic Law outside India.

*Paper VII.*

Comparative Study of Different Schools of Islamic Law.

*Paper VIII.*

Muslim Law as administered in British India.

G. *Epigraphy and Numismatics**Paper V.*

Select Inscriptions of India during Muslim rule.

*Paper VI.*

Coins of India during the Muslim period.

*Paper VII.*

- (a) Select Inscriptions of Islamic Countries outside India.  
 (b) Development of Arabic and Persian Scripts.

*Paper VIII.*

Coins of Muslim Countries outside India.

In each Group a subject for an Essay shall be set in one of the papers which will carry half the value assigned to that paper.

The Board of Higher Studies may, with the approval of the Executive Committee, from time to time, vary the alternative groups or the subjects comprised therein.

## ECONOMICS

The courses in Economics shall be as follows :—

*Paper I.*

History of Economic Thought (with a detailed study of one or more special texts to be prescribed by the Board of Higher Studies from time to time). .. 100 marks

*Papers II & III.*

Principles of Economics .. 100 marks  
 (each paper)

*Paper IV.*

Public Economics ( \*This paper includes public Finance with special reference to India). .. 100 marks

*Paper V.*

Modern Economic Development (Countries to be selected by the Board of Higher Studies from time to time). .. 100 marks

*Paper VI.*

Indian Economics (with a special study of selected problems to be prescribed by the Board of Higher Studies from time to time). .. 100 marks

*Papers VII & VIII.*

Two papers on any *one* of the following subjects to be studied, wherever possible, with reference to Indian conditions. .. 100 marks  
 (each paper)

- (1) Currency and Banking.
- (2) International Trade and Tariff.
- (3) Statistics and Demography.†
- (4) Mathematical Economics.†
- (5) Agricultural Economics including Co-operation.
- (6) Labour Problems.
- (7) Industrial Organisation.

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\* It is contemplated that at the Examination one half of this paper will consist of questions relating to India.

† A candidate taking either No. 3 or 4 as his special subject must have passed the B.A. Examination with Mathematics.

and such other subject or subjects as may be added by the Board of Higher Studies from time to time.

2. The limits of the subjects shall be defined and books shall be recommended from time to time by the Executive Committee on the recommendation of the Board of Higher Studies concerned so as to indicate generally the extent and standard of knowledge required. The Executive Committee may also on the recommendation of the Board of Higher Studies concerned alter or add to the subjects.

### POLITICAL SCIENCE

1. The courses in Political Science shall be as follows :—

*Paper I*

Social and Political Theory .. 100 marks

*Paper II*

History of Political Thought .. 100 marks

*Paper III*

Current International Relations (including a general knowledge of International law of Peace and War). .. 100 marks

*Paper IV*

Comparative Governments (constitutions to be selected by the Board of Higher Studies concerned from time to time). .. 100 marks

*Paper V*

Government in India .. 100 marks

*Paper VI*

Public Economics with special reference to India 100 marks

*Papers VII & VIII*

Any two of the following subjects .. 100 marks  
(each paper)

- (1) Early Political Institutions
- (2) Public International Law
- (3) Indian Political Thought—Ancient and Mediaeval
- (4) Public Administration and Administrative Law
- (5) Constitutional Law (with special reference to India).
- (6) Principles of Sociology and Social Psychology\*
- (7) Social Anthropology and Applied Sociology (with special reference to India)\*
- (8) Principles and Practice of Local Government (with special reference to selected countries)
- (9) Private International Law or Conflict of Laws
- (10) History of Diplomacy in International affairs and such other subject or subjects as may be added by the Board of Higher Studies.

\* A candidate who takes either subject 6 or 7 must also take the other.

2. The limits of the subjects shall be defined and books shall be recommended from time to time by the Executive Committee on the recommendation of the Board of Higher Studies concerned so as to indicate generally the extent and standard of knowledge required. The Executive Committee may also on the recommendation of the Board of Higher Studies concerned alter or add to the subjects.

## COMMERCE

1. The course shall include the following subjects

Realistic Economics.  
Business Organisation.  
Inland and Foreign Trade.  
Industrial Structure and Development.  
Accounting.  
Commercial Law.  
Economic History.  
Economic Geography.  
Currency.  
Banking.  
Insurance.  
Transport.  
Tariffs.  
Public Finance.  
Statistics.  
Mathematical Economics.  
Agricultural Economics.

Other subjects may be added to the above list, from time to time, by the Board of Higher Studies in Commerce.

2. One paper shall be set in each subject unless the Board of Higher Studies otherwise determines.

3. Candidates shall be examined ordinarily in eight subjects; of these, not less than four and not more than six shall be compulsory subjects, the remaining subjects shall be left to the choice of the candidates.

4. The Board of Higher Studies in Commerce shall, from time to time, determine what subjects shall be deemed compulsory.

5. The limits of the subjects shall be defined and books shall be recommended, from time to time, by the Board of Higher Studies concerned so as to indicate generally the extent and standard of knowledge required.

6. This course will be open only to students who have passed the B.Com. Examination of this University or of any other University if the said examination is recognised by this University: provided that those who have passed the M.A.

**Examination in Economics will be eligible for admission to the M.A. Examination in Commerce as private students subject to the provisions of Section 19 of the Indian Universities Act.**

### GENERAL

1. (a) In order to pass in subjects I to XIV-B a candidate must obtain 288 marks in the aggregate. No minimum pass marks shall be required in each paper, but if in any paper a candidate obtains less than 25 marks, those marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class, and those obtaining 480 marks in the First Class.

(b) In order to pass the subjects XV to XXVI a candidate must conform to the rules laid down in the Regulations for the M.Sc. Examination.

2. As soon as possible after the examination, the Syndicate shall publish a list of candidates who have passed in each subject, arranged in three classes and in order of merit. Candidates shall be bracketed together unless the Examiners are of opinion that there is clearly a difference in their merits.

Each successful candidate shall receive with his Degree of M.A. a certificate setting forth the subject in which he was examined, and the class in which he was placed.

3. The candidate who is placed first in the First Class in each subject comprising groups, if any, shall receive a Gold Medal and a prize of books to the value of Rs. 200, and the candidate who is placed second in the First Class in each subject comprising groups, if any, shall receive a Silver Medal and a prize of books to the value of Rs. 100.

In the subjects (comprising groups if any) common to both the M.A. and the M.Sc. Examinations, the Medals and Prizes shall be awarded on the combined results of the M.A. and M.Sc. Examinations :

Provided that the Gold or Silver Medal shall not be awarded to the candidate if he does not secure First Class marks in the aggregate in the common papers and the Essay paper in the subject.

The candidate who obtains the highest number of marks in each group comprised in a subject and has been placed in the First Class shall receive a prize of books to the value of Rs. 100 provided he has not obtained any medal or prize under the preceding clause.

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## CHAPTER XXXIII-A

### DOCTOR OF PHILOSOPHY IN ARTS AND SCIENCE (D.PHIL.)

1. Any Master of Arts or Science of the University of Calcutta, or (subject to the sanction of the Syndicate) any Master of Arts or Science of any other University recognised by this University for this purpose, may apply to the Registrar for registration for the D.Phil. Degree in the subject within the purview of the Regulations in which he has obtained the Degree of Master of Arts or Science, as the case may be, or in an allied subject.

2. The applicant shall state in the application for registration, his qualifications and indicate the subject which he proposes to investigate. The application must be supported by a certificate in a form to be prescribed by the Syndicate, from a teacher recognised by the University for this purpose, under whose guidance he intends to carry out the work. The Syndicate may exempt a candidate from production of the certificate in special cases.

3. Every application shall be placed before a D.Phil. Degree Committee consisting of the Vice-Chancellor, the President of the Post-Graduate Council in Arts or Science, as the case may be, the Dean of the Faculty concerned, Head of the Department in the particular subject, and two experts in the subject to be appointed by the Syndicate in consultation with the relevant Executive Committee. The Syndicate will grant the application for registration for the D.Phil. Degree after considering the recommendation of the said D.Phil. Degree Committee.

4. On his application being granted by the Syndicate the applicant shall be registered and shall work for two years under a teacher recognised by the University for the purpose and prepare a thesis for the Degree. He may, not later than one year after his registration, be permitted to change the subject or scope of his research with the approval of the D.Phil. Degree Committee.

5. The candidate for the D.Phil. Degree shall submit three type-written or printed copies of his thesis embodying the results of research and affording evidence of originality shown by him by the discovery of new facts or by a critical survey of facts or relations between facts discovered by others.

The candidate must produce along with the thesis a certificate from the teacher under whom he has worked, stating



that he has fulfilled the requirements of the Regulations relating to the nature and prescribed period of research work.

Notwithstanding anything contained above, the Syndicate may, in special cases, after considering the recommendation of the D.Phil. Degree Committee, permit a candidate for the D.Phil. Degree to submit a thesis prepared independently or under the guidance of a person having special knowledge in the subject or under the guidance of one of the University teachers recognised above provided that the candidate concerned has carried on research work for a period of at least two years after he has passed the M.A. or M.Sc. Examination. The candidate shall for this purpose submit an application to the Registrar which shall not be entertained unless two Doctors in any Faculty or two members of the Faculty concerned of this University or unless two members of the relevant Council of Post-Graduate Teaching of this University have testified to the satisfaction of the Syndicate that in habits and character the candidate is a fit and proper person for the D.Phil. Degree. After the permission to present the thesis for the D.Phil. Degree has been granted by the Syndicate, the candidate shall be enrolled as a candidate for the D.Phil. Degree in a register for such candidates.

6. The candidate may also submit in support of his thesis the contents of any work he may have previously published but he shall not submit as his thesis any work for which a Degree of Distinction has been conferred on him in this or any other University. He will not, however, be precluded from incorporating any such work in a thesis covering a wider field, provided he indicates in a written statement the work so incorporated.

7. Every candidate shall forward with his thesis a fee of Rs. 200. No candidate who fails to pass or present himself for examination shall be entitled to claim a refund of his fee.

8. After considering the recommendation of the D.Phil. Degree Committee, the Syndicate shall refer the thesis to a Board of three examiners including the teacher, if any, under whom the candidate has worked.

If the thesis is approved by the Board of Examiners, they will furnish the Syndicate with a report indicating in what respects the thesis affords evidence of originality.

9. After the thesis has been approved by the Board of Examiners the candidate shall be asked to appear at an Oral examination, and also in the case of a Science subject at an Oral or Practical examination or both, in respect of the subject of his thesis to be held by at least two examiners of whom the teacher, if any, under whom he worked will ordinarily be one.

The examiners may also ask question beyond the subject of the thesis in order to satisfy themselves that the candidate

has adequate knowledge of the particular branch of Arts or Science on which he has submitted his thesis.

10. If the examiners are satisfied with the Oral or/and Practical examination, they shall submit a report to the Syndicate approving the work of the candidate.

If the candidate fails to satisfy the examiners at the Oral or/and Practical examination, the Syndicate may, on the recommendation of the examiners, permit him to appear again at the Oral or/and Practical examination after six months but within a period not exceeding one year following the date of his failure. The fee on re-entry shall be half the fee originally paid.

11. If the Syndicate, after considering the report of the examiners, are satisfied that the candidate is worthy of the Degree of D.Phil., they shall cause his name to be published with the title of the subject of his thesis.

12. A Diploma under the seal of the University and signed by the Vice-Chancellor will be given to each successful candidate at the next Convocation held for conferring Degrees.

13. Notwithstanding anything contained in the above Regulations, if the thesis of a candidate, originally presented for admission to the D.Litt. or D.Sc. Degree under the provisions of Chapter XXXIV and XXXVIII, respectively, is not recommended by the Board of Examiners concerned but is on the other hand adjudged by them to be of sufficient merit to justify his admission to the D.Phil. Degree, the thesis shall, if the candidate so elects, be deemed to be a thesis presented and approved for the D.Phil. Degree for the purposes of Sections 8 and 9 above. Such a candidate shall, unless specially exempted by the Syndicate on the recommendation of the Board of Examiners, be asked to appear at an Oral or/and Practical examination, as the case may be, to be conducted by a Board of Examiners to be specially constituted by the Syndicate for the purpose. The examiners may ask questions beyond the range of the subject of his thesis.

The provisions of Sections 10, 11 and 12 will apply to these candidates.

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## CHAPTER XXXIV

### DOCTOR OF LITERATURE

1. Any Master of Arts of the University of Calcutta may offer himself as a candidate for the Degree of Doctor of Literature provided three years have elapsed from the time when he passed the examination.

2. Every candidate shall state in his application the special subject within the purview of the Regulations for the Degree of Master of Arts, upon a knowledge of which he rests his qualification for the Doctorate, and shall, with the application, transmit three copies, printed or type-written, of a thesis that he has composed upon some special portion of the subject so stated, embodying the result of research, or showing evidence of his own work, whether based on the discovery of new facts observed by himself, or of new relations of facts observed by others, whether constituting an exhaustive study and criticism of the published work of others, or otherwise forming a valuable contribution to the literature of the subject dealt with or tending generally to the advancement of knowledge. The candidate shall indicate, generally in a preface to his thesis and specially in notes, the sources from which his information is taken, the extent to which he has availed himself of the work of others, and the portions of the thesis which he claims as original; he shall further state whether his research has been conducted independently, under advice, or in co-operation with others, and in what respects his investigations appear to him to tend to the advancement of knowledge.

3. Every candidate may also forward with his application three printed copies of any original contribution or contributions to the advancement of the special subject professed by him, or of any cognate subject, which may have been published by him independently or conjointly, and upon which he relies in support of his candidature.

4. No application shall be entertained unless two members of the Faculty of Arts or two Doctors in any Faculty of this University or of a University approved by the Syndicate from time to time shall have testified, to the satisfaction of the Syndicate, that in habits and character the candidate is a fit and proper person for the Degree of Doctor.

5. Every candidate shall forward with his application a fee of Rs. 300. No candidate who fails to pass or present himself for examination shall be entitled to claim a refund of the

6. The thesis mentioned in Regulation 2 and the original contribution, if any, mentioned in paragraph 3, shall be referred by the Syndicate to a Board of three Examiners.

7. If the thesis is approved by the Board and if the candidate has obtained a First Class at the examination for the Degree of Master of Arts, he shall not be required to submit to any further written examination ; but he may be required by the Board, at their discretion, to appear before them to be tested orally, or practically, or by both these methods, with reference to the thesis and the special subject selected by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the Oral and Practical examinations, if any , and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Literature, they shall cause his name to be published, with the subject of his thesis, and the title of his published contributions (if any) to the advancement of knowledge.

8. If the candidate is a person who has obtained a Second or a Third Class at the examination for the Degree of Master of Arts, and, if his thesis is approved by the Board, he shall be required to submit to a written examination.

Two papers of three hours each shall be set, one upon the special subject mentioned in the application of the candidate, and the other upon the subject of the thesis. The candidate may also be required by the Board, at their discretion, to appear before them to be tested orally or practically or by both these methods with reference to the thesis and the special subject professed by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the written examination and also of the Oral and Practical examinations, if any ; and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Literature, they shall cause his name to be published, with the subject of his thesis, and the titles of the published contributions (if any) to the advancement of knowledge.

9. In the case of a candidate obtaining a Second Class at the Examination for the Degree of Master of Arts and falling under the preceding Regulation, if the Board, upon an examination of his thesis and of his original contribution or contributions to the advancement of knowledge, hold the same to be generally or specially of such special excellence as to justify the exemption of the candidate from the written examination, he may be so exempted by the Syndicate, provided that the report of the Board shall set forth the fact and the grounds of such exemption.

10. A diploma under the seal of the University, and signed by the Vice-Chancellor, shall be delivered at the next

Convocation for conferring Degrees to each candidate who has qualified for the Degree.

11. Every candidate shall be at liberty to publish his thesis, and the thesis of every successful candidate shall be published by the University with the inscription : "Thesis approved for the Degree of Doctor of Literature in the University of Calcutta."

## CHAPTER XXXIV-A

### BACHELOR OF COMMERCE

1. The examination for the Degree of Bachelor of Commerce shall be held annually in Calcutta and such other places as shall, from time to time, be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Any person may be admitted to the examination who, after passing the Intermediate Examination, has prosecuted a regular course of study for not less than two academical years in one or more Colleges affiliated to the University for the purpose or in any classes held by the University.

3. Every candidate shall produce a certificate (a) of good conduct and (b) of diligent study, and shall send in his application with a certificate in the form prescribed by the Syndicate to the Controller of Examinations in time so that it may reach his office at least six weeks before the date fixed for the examination.

4. A fee of rupees forty-five shall be forwarded by each candidate along with his application. A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted subsequently to one or more Degree Examinations in Commerce on payment of a like fee of rupees forty-five, subject to the provisions of Sections 4B and 4C.

4A. If a student, after completion of a regular course of study for the examination does not register himself as a candidate for, or present himself at, the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Head of the Institution at which he last studied, or from a member of the Senate, testifying to his good character during the intervening period.

If such student does not register himself as a candidate for, or appear at, any of the two examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, on payment of the prescribed fee, provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes

a fresh course of study for at least six months immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination, he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing at the examination under the second paragraph of this Section will be deemed to be non-collegiate students.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who, having been allowed to appear at the examination as a non-collegiate student on account of shortage of attendance at lectures, does not register himself as a candidate for or present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students appearing under the first and second paragraphs above will be treated as non-collegiate students.

4B. If a student appears at the examination and fails, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied or, with the permission of the Syndicate, from the Principal of any other College affiliated to the University, that he has passed the Test examination held by such a College immediately preceding the examination to which he seeks admission and a certificate either from the Principal of such a College or from a member of the Senate, testifying to his good character during the intervening period.

Second, third and fourth paragraphs of Section 4A above shall apply to students referred to in this section.

4C. If a candidate is unsuccessful at the examination on account of failure to secure pass marks in one subject only but obtains 40 per cent. of marks in aggregate in other subjects, he may appear for re-examination in that subject alone in which he has failed, on payment of a fee of Rs. 23, at a special supplementary examination, if held by the University, six months after the examination at which he was unsuccessful, or at the next annual examination, but not at both :

Provided that the candidate produces, in addition to the ordinary certificate or certificates required by the Regulations, a certificate from the Principal of the College at which he last studied or from a member of the Senate, testifying to his good character during the intervening period.

If the candidate obtains pass marks in the subject at the examination, he shall be declared to have passed the examination as a whole.

If such a candidate fails to pass in the subject at the re-examination or fails to appear at any of the examinations mentioned in the first paragraph and seeks admission to any subsequent annual examination of the University, he will be required to appear in all the subjects prescribed for the examination, subject to the provisions of Section 4B above.

5. The Degree Examination in Commerce will be conducted by means of printed papers, the same papers being used at every place where the examination is held.

6. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed, arranged in two classes, both in order of merit. Names of candidates who pass the examination under Section 4C above shall be published separately, arranged in alphabetical order, without any class or distinction. Every candidate on passing shall receive a certificate in the form prescribed.

7. Every candidate shall be examined in the following subjects :—

(1) English Composition including essay, précis writing and drafting of business letters :—

Essay—30 marks	}	—one paper.
Précis writing—30 marks		
Drafting of letters—40 marks		

(2) One of the following languages :—

Bengali, Assamese, Hindi, Uriya, Urdu, Malayalam, Gujrathi, Tamil, Telugu, Kanarese, Japanese, French, German and Italian—*one paper*.

The Syndicate shall have power to add to or modify the list.

(3) Accountancy—*one paper*.

(4) Commercial Law—*one paper*.

#### GROUP A

*Papers (5) and (6) :*

General Economics—*one paper*.

Indian Economics—*one paper*.

#### GROUP B

*Papers (7) and (8) :*

Business Organisation—*one paper*.

Commercial Geography—*one paper*.



## GROUP C

*Papers (9) and (10) :*

Any one of the following :—

- (1) Advanced Accountancy—*one paper.*  
Auditing—*one paper.*
- (2) Trade and Tariff—*one paper.*  
Transport—*one paper.*
- (3) Banking—*one paper.*  
Currency—*one paper.*
- (4) Statistics—*one paper.*  
Insurance—*one paper.*
- (5) Public Administration—*one paper.*  
Public Finance—*one paper.*
- (6) Land Systems—*one paper.*  
Agricultural Economics—*one paper.*
- (7) Economic History—*one paper.*  
Modern Industrial Organisation with special reference to India—*one paper.*

8. Each paper shall be of three hours and shall carry 100 marks.

9. The limits of the subjects shall, from time to time, be defined by the Syndicate, on the recommendation of the Board of Studies concerned.

10. In order to pass, a candidate must obtain 30 per cent. of the marks in each subject or group of subjects and 40 per cent. of marks in the aggregate, provided that a candidate who takes up an Indian language must obtain 40 per cent. of the marks in the subject. In order to be placed in the First Class, he must obtain 60 per cent. of the marks in the aggregate.

11. The following syllabus defines the limits of subjects prescribed for the B.Com. Examination :—

## ACCOUNTANCY

## (COMPULSORY)

The following course, in extension of that prescribed for Elements of Book-keeping in the I.A. Examination.

Definitions of commercial terms and various statements of account such as Balance Sheet, Profit and Loss Account, Appropriation Account, Income and Expenditure Account, Manufacturing Account, Receipts and Payments Account, Voyage Account, etc. The use of the various books of account including the Journal and the Petty Cash Book.

Principles of Double Entry Book-keeping—Preparation of Trial Balance and various statements of Account including the Balance Sheet.

Single Entry—Preparation of statements under Single Entry system. Comparison with Double Entry system and drawbacks of Single Entry system. Conversion of Single Entry into Double Entry.

Negotiable Instruments—Treatment of dishonoured and deferred bills.

Depreciation, Reserves, Reserve Funds and Sinking Funds.

Accounts Current and Average Due Date.

Goods on Sale or Return, Consignments and Joint Ventures.

Simple cases of partnership Accounts, excepting dissolution of partnership but including a knowledge of Partnership Law.

Joint Stock Companies—Formation of Companies—Statutory and Statistical books—Various kinds of shares and debentures—and entries relating thereto, including forfeiture of shares and debentures—Preparation of final accounts and peculiarities to be observed in the case of banking institutions. A good knowledge of the Indian Companies Act is essential.

N.B.—Questions of an advanced character may be set on the matter prescribed for Elements of Book-keeping in the I.A. Examination.

## COMMERCIAL LAW

### (COMPULSORY)

Commercial Law—its scope and nature.

The Law of Contract—Communication, Acceptance and Revocation—Voidable Contract and Void Agreement—Coercion, undue influence, fraud, misrepresentation and mistake—Form and Consideration—Agreements—Novation—Recession—Alteration—Appropriation of payment—Breach of contract—Termination of contract—Relationship resembling those created by contract.

Agency—Sub-Agency—Ratification—Termination of Agency—Principal and Surety—Indemnity and Guarantee.

Bailment—Termination—Pawner and Pawnee—Mortgages of movable and immovable properties.

Mortgages—Simple Mortgage—Mortgage by conditional sale—Hypothecation.

The Contract of Carriage—Common Carrier—Railway Companies—Carriage of goods by sea and land.

Indian Partnership Act, 1932—Joint Hindu Family—Firm—Minor as partner—Registration of firm.

Indian Sale of Goods Act, 1930.

Law relating to Negotiable Instruments—Hundies—Promissory notes and Bills of Exchange.

Law of Arbitration—Indian Arbitration Act—Arbitration under the Civil Procedure Code.

Law relating to Companies—Public and Private Companies—Memorandum and Articles of Association—Prospectus—Capital—Directors—Resolutions—General, Statutory and Extraordinary Meetings—Loans, Mortgages and Debentures—Liquidation or Winding up.

Law relating to Fire and Marine Insurance.

Law relating to Insolvency—Presidency Town Insolvency Act—Provincial Insolvency Act.

#### GROUP A—PAPER (5)—GENERAL ECONOMICS—ONE PAPER

Definition and scope of economics—methods of study—fundamental economic concepts—wealth, utility, capital, income and value—consumption—the law of demand—elasticity of demand—wants and activities—production—factors of production—the laws of return—the law of population—modern industrial organisation—types of business organisation—industrial combination—trusts—national and international—cartels—market—theory of value—joint demand and joint supply—distribution—national dividend—rent, wages, interest and profits—labour problems—exchange—money, functions and value of money—Index numbers—credit and prices—monetary standard—monometallism and bimetalism—international gold standard—paper money—appreciation and depreciation—stabilisation—functions of banks—types of banks—reserves and investments—bank rate—Central banks—international trade—international value—the law of comparative costs—distribution of precious metals—the balance of trade—mechanism of international payments—foreign exchange—fiscal policy—export and import duties—public finance—equity in taxation—incidence of taxation—direct and indirect tax—progressive and proportional tax—economic functions of the state.

#### GROUP A—PAPER (6)—INDIAN ECONOMICS—ONE PAPER

Geographical factors—physical factors affecting the economic life of the people.

Special factors—village system and rural economy—caste—its economic significance—joint family—laws of inheritance—status and custom—organisation of agriculture, handicrafts and domestic industries of India—caste guilds—city industries—Mahomedan guilds—indigenous organisations of trade, transport, banking and agricultural credit.

Political factors—*Pan Britannica*—its economic effects—chief British Indian systems of land tenure—their economic consequences—political relation of India to England—effect on balance of trade.

Consumption—standard of life—comparison with other countries—statistics of consumption.

Production—principal crops—output in India and abroad—features of Indian agriculture—fragmentation and subdivision of holdings—agricultural indebtedness—pressure of population on land—economic transition in India—growth of large-scale industries—efficiency of labour—technical education—labour legislation—capital requirements—foreign capital.

Distribution—national income—*per capita* income—rent as affected by state landlordism—by permanent settlement—tenancy legislation—custom—wages of different occupations—average wage rates—real wages—profits—commercial and industrial.

Exchange, Currency and Banking—history of Indian currency—Currency Committees and Commissions—Paper Currency System—history of Indian prices.

Main constituents of the Indian banking system—Reserve Bank—Imperial Bank—Exchange Banks—Indian joint-stock banks—indigenous bankers—bill market—Industrial banks—land mortgage banks—co-operative banks.

Public Finance—Sources of Revenue and heads of expenditure—Central and Provincial—Home charges—Public Debt—finances of Bengal and Assam—Local Finance.

State and Industry—Industrial Policy—Tariffs and Transport—Import and Export duties—Cotton excise controversy—Discriminating protection—Imperial Preference—Protection to Steel, Cotton, Textile and Sugar Industries—Railways and Shipping.

#### GROUP B—PAPER (7)—BUSINESS ORGANISATION— ONE PAPER

Economic basis of trade and industries—classification of trade and industries—scale of business units.

Different forms of business organisation and tests of their efficiency—individual proprietorship—partnership—joint-stock companies—co-operative societies—federation organisations—pools—trusts—cartels—holding companies—amalgamation.

General knowledge of organisation and management of factory—considerations for laying out a factory—division of labour—various departments—control—different forms of wages—efficiency of labour—how to improve it—elementary cost accounting and costing methods.

Organisation of office—various departments—co-ordination—labour-saving devices—codes.

Organisation of trade—home, foreign—wholesale and retail—departmental store—multiple shops—co-operative societies—broker and middlemen—their functions and remuneration—mail-order business—salesmanship.

Tariffs—customs—and commercial practices in different countries.

Financing of trade and industries—Central Banks—Commercial Banks—Industrial Banks—Co-operative Banks—Agricultural Banks—Stock exchanges—Investment Trusts—various methods of inland and foreign remittances—methods of financing trade in different countries.

Produce Exchanges—Transaction in futures—Speculation.

Scientific Advertisement.

Insurance Organisation—various methods—Warehouses.

Organisation of chief industries and trades of India.

Preparation of Commercial instruments—Secretarial practice.

Institutions, both state and private, for the furtherance of trade—Representation of commercial interest in foreign countries.

Market quotations and market reports.

#### GROUP B—PAPER (8)—COMMERCIAL GEOGRAPHY— ONE PAPER

Why we should study Economic Geography—its nature and scope—relation to other sciences.

Physical factors bringing about variation in the economic life of a people.

Non-physical causes affecting economic life—race—religion—Government—density of population—historical usage and customs—geographical inertia.

Different industries of the world—hunting—pastoral—mining—agricultural—manufacturing—factors bringing about localisation.

Different methods of transport—land—water—air—their advantages and disadvantages—routes of international importance—causes that bring about changes in the volume and direction of traffic.

Development of ports and inland trade centres—principles and illustrations.

Coins and Currencies of important countries of the world—weights, units of sale and units of shipment of principal commodities to and from various countries.

Geographical distribution of principal commercial commodities—conditions affecting their production and carriage—their chief markets.

Economic Geography of the principal countries of the world—climate, soil, etc.—distribution of population—principal economic products—chief industries—ports and cities—communications—trade balance and trade relationship.

Economic Geography of India in detail.

Economic Zones—their prospects and possibilities.

Prospects of economic development of different countries.

**GROUP C—PAPERS (9) AND (10)—ADVANCED ACCOUNTANCY**  
**—ONE PAPER; AUDITING—ONE PAPER**

**ADVANCED ACCOUNTANCY**

The following course in extension of that prescribed for the compulsory paper on Accountancy :—

Self-balancing ledgers.

Departmental Accounts, Branch Accounts and Foreign Exchange.

Double Accounts.

Higher portion of Partnership Accounts including dissolution of partnership. A very thorough knowledge of the Partnership Act is essential.

Higher portions of Joint-stock Company Accounts, including Bonus Shares, Reduction of Capital and Redemption of Debentures. Amalgamation and Reconstruction of Companies. A thorough knowledge of the Indian Companies Act will be presumed.

Bank and Insurance Accounts.

Royalty Accounts—Higher purchase accounts—Instalment payment purchase accounts—Investment Accounts and Stock exchange transactions.

Miscellaneous Accounts including insurance claims—treatment of life policy taken over in satisfaction of debt due—Marine Insurance Accounts—Accounts of Charitable Institutions.

Cost Accounts.

*N.B.*—Questions of an advanced character may be set on the subject-matter prescribed for the compulsory paper on Accountancy.

**AUDITING**

Meaning and Object of Audit—qualifications which an Auditor must possess.

Audit of the books of original entry and the different ledgers—verification of assets and liabilities. Internal checks.

Audit of Trading and Manufacturing Accounts—Profit and Loss Account and Balance Sheet.

Special considerations in different classes of audit—Audit of accounts of sole traders, firms and companies.

Divisible profits and dividends.

Liability of Auditors.

Investigations.

*Note.*—Some important case laws to be prescribed from time to time by the Board of Higher Studies in Commerce.

**GROUP C—PAPERS (9) AND (10)—TRADE AND TARIFF—  
ONE PAPER ; TRANSPORT—ONE PAPER**

**TRADE AND TARIFF**

Meaning of Trade—what it consists of—classification of trade—necessity for different classes—their evolution and present tendency.

Distinction between inland trade and foreign trade—their relative importance in different countries—theory of comparative costs—international values.

Procedure for export and import trade—for inland trade—documents used—invoice—bill of lading—charter party—railway receipt—insurance policy, etc.

Customs formalities—bonded warehouse—warehousing.

Financing of trade—both inland and foreign—foreign exchanges—bill of exchange—letter of credit—methods of financing trade in different countries.

Institutions for the furtherance of trade, both state and private—representation of commercial interests in foreign countries.

Review of trade—recent tendencies.

Market quotations and market reports.

Economic arguments for free trade—Qualifications to above arguments.

The rationale of protection—Diversification of Industry Argument—Infant Industry Argument—National Self-sufficiency Argument—Dumping and stability of production—Anti-dumping legislation—Bounty *vs* Import duty.

The evils of protection—burden on consumers—tariffs and trusts—tariffs and inefficient methods of production—effect of tariff on the distribution of wealth.

Protective and Revenue Duties—Import Duties—their incidence—the effect of Import Duties on the price of dutiable articles.

Export duties for revenue and protection—consideration of the Indian export duties.

Reciprocity, Retaliation and Preference within the British Empire—India and Imperial Preference—Ottawa Agreement.

Problems of tariff administration—comparative merits of *ad valorem* and specific duties—administrative difficulties connected with *ad valorem* duties—problems of valuation.

The development of commercial policy in India—the Indian import duties in revenue and protective aspects—the Cotton Excise Controversy—the post-war developments in Indian fiscal policy—policy of discriminating protection—Indian tariff problem in relation to cotton steel and sugar industries.

## TRANSPORT

Organisation—Organisation of rail, road and water services—State ownership and State control of modern railways—capital and revenue expenditure on railways—railroad construction finance—pooling and agreements—classification of roads, and road maintenance—problem of road power—condition of carriage by railways as common carriers—the Carriers' Act—the rights and obligations of the consigners and the consignees under the Carriers' Act—the carriage of persons and animals by railways—passenger's luggage.

Rates and Regulations—Railway traffic—goods and passenger—passenger fares—passenger tickets—theory of railroad charges—railway rate-making in practice—competitive rates—flat rates discriminations—problems of special rates—problems of routing—rate wars—port rates and wagon load rates—adjusted and differential rates—terminal charges and block rates—reasonable rates—standard charges—Government control over railway rates—British railways in and after the Great War—U. S. A. railways—Long and short haul classes in railway rates-making.

Indian Railways—Lord Dalhousie and Sir John Lawrence in the shaping of the Trunk line in Indian railway systems—the Whitehall in the Indian railway development of the 19th century and after—Government control over the Indian Railways—the Railway Board as organ of Government control—gauge problems and the problems of minimum rates over the Indian Railways—freight classifications and the Indian Railways Conference Association, the shaping of the freight structures for the Indian Railways—competition and co-ordination between the Indian Railways in rates-making. Problems of discriminative rates and co-ordinated freight tariff over the Indian Railways—Problem of reasonable rates and undue preference over the Indian Railways.

State purchase and State construction of the Indian Railways—The Indian guaranteed and the Branch Line Railways finance—The McKay, the Acworth, and the Incheape Committees in the financial reorganisations of the Indian Railways—The Acworth Committee on the State management of the Indian Railways and provisions for their capital supply—The Acworth Committee on the new reform over the Indian Railways. The Indian Railway Act—The Indian Railways Rates Advisory Committee—The Indian Railways Rates policy in the shaping of the Indian industries.



GROUP C—PAPERS (9) AND (10)—BANKING—ONE PAPER;  
CURRENCY—ONE PAPER

BANKING

Banking Theory—Functions and economic services of banks—Types of banks—Commercial Banks—Exchange Banks—Industrial Banks—Savings Banks—Agricultural Banks.

General structure and methods of commercial banking—working capital—deposits—cheques—bank drafts and inland remittances—the management of banking resources—the short-term loan fund—market rate of discount—Loans and Advances—Investments—Acceptances—Cash Reserves—Recent tendencies of commercial banks—Amalgamation—Branch banking.

Constituent elements of the Money Market—Clearing House—Comparative study of the Big Five—the D's of Germany—the National Banks and State Banks of America—The Commercial Banks of India—the Imperial Bank of India—the indigenous bankers and their services—Principal credit instruments used in indigenous banking.

Decentralised and Centralised banking system—Functions of the Central Bank—Co-operation with the other Central Banks—Monetary stabilisation through C. B. action—the Bank of England—the Federal Reserve system—the Reichsbank—the Bank of France—the Reserve Bank of India—the Bank for International Settlements—Canadian Banking system.

The Stock Exchange—its relation to the banking system—Speculation—Functions of the speculative dealers—the bulls and bears—the constitution of the Bombay and the Calcutta Stock Exchanges—Modern problems connected with them—the effects of Government borrowing on the Indian Money Market.

Foreign Exchange—the theory of Foreign Exchange—the means and mechanism of payment—fluctuations in the exchange rates—commercial bills of exchange—bank bills—finance bills—the letter of credit—London Acceptance Credit—Exchange arbitrage—the Arithmetic of Foreign Exchange—Reading of Money Market Article.

Banking practice—Relations between the banker and the customer—the deposit account—current account—cheques and bills of exchange—personal elements and securities—collection of bills and cheques—discounting of bills—daily balances—the general ledger—deposit receipt—purchase and sale of stocks and shares—Foreign Exchange business—gratuitous services.

Bank Management—Powers and duties of directors, shareholders and managers—bank officers—cashier—inspectors, etc.—Banking Organisation—Chartered Banks—Incorporated Banks—private banks—Indian Companies Act—The different types of bank accounts.

Banking law—Banker and the Customer—Banker's entries in the Pass Book—Paying Banker and the Collecting Banker—the Negotiable Instruments Act—Bankers and the guarantee—Legal and equitable mortgage—Bank's hold over different securities—Banker's lien and pledge—Banker's Book Evidence Act—Banking Legislation in America and India.

General Banking Statistics—The Bank balance-sheet, capital, reserve, deposits, total and immediate liabilities—proportion of cash as against outstanding liabilities—profitable and non-profitable assets—Clearing House Figures—Bank rate and Market rate.

### CURRENCY

The Economic Importance of Money—Definition of Money—Origin of Money—Functions of Money—Qualities of good money materials.

Evolution of Metallic Money and Coinage—Requisites of good coinage—limit of tolerance—seigniorage—brassage—gratuitous and free coinage—Mint price of gold—different types of Money—Standard Money—Token money—principles of token coinage—Representative paper Money—Fiat Money—Convertible and inconvertible paper money—deposit currency—Methods of regulation of note-issue—Gresham's law—Characteristics of a good currency system.

Value of Money—Quantity theory—measurement of changes in the value of money—Economic consequences of rising and falling prices—Price movements in the 19th and 20th centuries—Prices and international movement of specie—Monetary stability.

Monetary standards—Monometallism—Bimetallism—Gold-exchange standard—Gold bullion standard—Symmetallism—Tabular standard—Currency inflation and credit inflation—the effect of inflation—Restoration of the international gold standard—Deflation and devaluation—Suspension of the gold standard—Money and Business Cycles.

The Monetary System of India—Coinage Act of 1835—agitation for gold currency—Development of Government paper currency—fall in the value of silver—its consequence—Herschell Committee—closure of the Mints—the Fowler Committee—the Evolution of the G. E. Standard—the Chamberlain Commission—Effects of the War on Indian Currency and Exchange—breakdown of the Gold Exchange Standard—the Babington Smith Committee—the Hilton-Young Commission and the ratio controversy—the Currency Act of 1927—the suspension of Gold Standard—the linking of the rupee to sterling—Gold exports during 1929-33—purchase and sale of sterling—Government reserves for maintaining the value of currency—the gold standard

reserve—the Cash balances—Government as the currency authority and exchange banker—Government's method of expanding and contracting currency.

GROUP C—PAPERS (9) AND (10)—STATISTICS—ONE PAPER;  
INSURANCE—ONE PAPER

STATISTICS

Definition and historical development of statistical science.

Its uses, characteristics and sources.

Collection and analysis of data.

Definition, tabulation and formulation of Problems.

Frequency distribution and Graphs.

Graphical methods and interpolation.

Types and averages : weighted mean, its significance and use.

Dispersion ; moments : standard deviation.

Time series, mortality tables, moving average. trend and fluctuation.

Index numbers and their uses.

Use of slide rules and other machines for tabulation, and sorting, such as comptometer, etc.

The main sources of official statistics, their character and meaning.

INSURANCE

Insurance in general—its origin and uses. Insurance as a factor in business.

Fundamental principles of Insurance—Necessity of insurance and nature of Insurable interest. Difference between insurance and gambling. The law of average in its application to insurance. Differences between life and other forms of insurance.

Under-writing of Insurance—Risks—Mortality Tables.

Life Insurance Premiums—number of ways in which premium payment can be made, and the merits of the current ones—basis of premium calculations.

Reserves, surrender and paid-up values and loans against policies. Assignment of policies.

Policy reserve.

Solvency Reserve *vs* Reserve when the valuation is undertaken with a view to distributing profits.

Basis of Valuation.

Investments—types of investments usually chosen by Life offices.

Types of Insurance Organisations (mutual, proprietary, etc.) and classes of insurance combined with life assurance, such as Disability Insurance.

Types of Insurance Policies—Annuities.

Organisation of Insurance business.

Insurance Law—Provident Insurance Societies Act, 1912, Indian Insurance Companies Act, 1913, and Indian Insurance Companies Act, 1928, and the rules framed thereunder—Returns.

Elements of the Law and Practice of—

(a) Marine Insurance.

(b) Miscellaneous Insurance.

Re-Insurance.

## GROUP C—PAPERS (9) AND (10)—PUBLIC ADMINISTRATION —ONE PAPER ; PUBLIC FINANCE—ONE PAPER

### PUBLIC ADMINISTRATION

Fundamental concepts.

Meaning of Constitution—characteristics of the English Constitution—its constituent elements.

The Executive—the Crown—powers of the Crown—the prerogative—Nature and functions of the Cabinet—Ministry—Privy Council—Ministerial responsibility—the War Cabinet—Cabinet Secretariat—Cabinet Committee of Imperial Defence.

Ministers and the Permanent Civil Servants—Government Departments.

The Legislature—the franchise—functions of the House of Commons—its privileges—legislative procedure—House of Lords—its composition and functions—the Parliament Act of 1911.

The Judiciary—organisation of the courts—Rule of Law—Liberty of the subject—Law and Equity.

Local Government Systems—Powers and duties of local authorities—local taxation—nature of local expenditure—Ministry of Health.

Federation and Unions—Outline of the constitutions of Canada, South Africa and Australia—Imperial Co-operation during the War—Imperial Conference—Colonial Laws Validity Act—Statute of Westminster—Crown Colonies, Protectorates and Mandated territories.

Government of India—A brief historical survey of the development of the Indian Constitution—the Secretary of State for India and his Council—control of the Secretary of State over administration—the Governor-General and the Executive Council—Central and Provincial subjects of administration—the Governor—his Executive Council and the Ministry—the dyarchy.

The Legislature—the Central Legislature—its powers and functions—provincial legislature—its control over administration and finance.

The Judiciary—organisation of the courts.

Indian States—The constitutional relation between the States and the Government of India.

## PUBLIC FINANCE

Introductory—The nature of Public Finance—principles of Public Expenditure—Central and local expenditure—division of financial duties between State and local bodies.

Public Revenues—Commercial Governmental revenues—principles underlying Government industrial enterprise—Tax—Revenues—the problem of justice in taxation—Taxable capacity—Double Taxation—shifting and incidence of taxation—Taxes on Income and Taxes on Property—Taxes on commodities—Taxes on Transactions—Taxes on corporations.

Central and Local Taxation.

Public Debts—its nature and necessity—forms of Public debts—conversion—repayment of public debts.

Indian Finance—a study of Indian Taxes in general—allocation of resources between Central and Provincial Governments—Indian Public Debts.

Financial Administration in India and Great Britain.

GROUP C—PAPERS (9) AND (10)—LAND SYSTEMS—ONE PAPER ;  
AGRICULTURAL ECONOMICS—ONE PAPER

## LAND SYSTEMS

Land Tenure—types of Land Tenure in India—its nature—Occupancy and Non-occupancy Ryots—Sub-proprietary and tenant rights.

What is a Settlement ? Principles and requisites of a settlement—classification of settlements—General outline of settlements—in British Baluchistan, Madras, Burma, Bombay, the United Provinces, Punjab and Central Provinces. Special settlement—Tea and Coffee Estates, Rubber Estates in Burma and Khasmahals—Permanent Settlement in Bengal—its objects and results. Position of the Zamindars before and after the settlement—Government and Ryots—the relation between Zemindars and Ryots. Tenancy Acts—Subinfeudation—criticism and suggested remedies.

Ownership of land—State *vs* Individual—Land Revenue, a Tax or Rent ?—Ricardian Theory in relation to land revenue in India—Application of the principles of taxation to land revenue—Legislative control—progress of Land Revenue Legislation.

A brief description of land tenures in the Western countries.  
Problems in regard to Nationalisation of land—Re-distribution of Holding.

### AGRICULTURAL ECONOMICS

Factors of Production—Land, physical conditions with special reference to Bengal and Assam—Tenure—present law of land tenure—Rules of good husbandry—size and character of Holdings—Economic unit of farms, arrangement of farms with special reference to Bengal—Family farms—Large-scale farming—Government model farms.

Open field system—enclosure system—Arable and Grass farms.

Farm equipment, permanent and temporary—Animal and mechanical power.

Labour cost—agricultural wages—Index number of wages—harvest prices and Wages—Wages in agriculture and in industry.

Management, technical and economic—purchase of requisites—co-operative buying.

Cost of Production—Rent, Interest on capital, expenditure on land and implements, local rates and cesses—wages—current expenses—seed—fertilisers—feeding stuffs.

Farm Accounts.

Live-stock and Fertility maintenance.

Marketing—Methods of disposal—consumption by producers—direct sale—sale through intermediaries, the system of '*dadan*' in Bengal and Assam—co-operative marketing—co-operative marketing in U. S. A., Denmark, Canada, Australia and Japan—recommendation of the Jute Enquiry Committee.

Markets—Fairs and *melas*—modern market—the cotton market in Berar and Amalner—the organisation of various trades, especially Rice, Wheat, Jute and Cotton—dealing in Future—essential services in large-scale marketing—Grading.

Prices—conditions affecting supply and demand of Rice, Wheat, Jute and Cotton—Price variations—seasonal fluctuations—Index number of agricultural prices—monetary causes of price variations—control and regulation of produce—recommendations of the Jute Enquiry Committee.

Village Economic Survey.

Agricultural indebtedness—co-operative credit societies—land mortgage banks—debt conciliation—regulation of the rate of interest.

Rural industries subsidiary to agriculture.

**GROUP C—PAPERS (9) AND (10)—ECONOMIC HISTORY—ONE PAPER : MODERN INDUSTRIAL ORGANISATION, WITH SPECIAL REFERENCE TO INDIA—ONE PAPER**

**ECONOMIC HISTORY**

Elizabethan England—Policy of Burleigh—Trade and Trading Companies—Colonisation—Agriculture and Industry on the eve of the Industrial Revolution—Industrial Revolution—Agricultural Revolution—Inland and Oceanic Transport—Labour Movement—Labour Legislation—Poor Law Reform—Origin and Growth of Banking—Free Trade Movement—Agricultural Decline—Protectionist Reaction—Co-operative Movement—Industrial Combinations.

**MODERN INDUSTRIAL ORGANISATION WITH SPECIAL REFERENCE TO INDIA**

General industrial economy—Organisation of Industries—Handicraft system—Guild system—Domestic system—Factory system—Importance of Machinery—The place of Labour—Modern marketing organisation—Modern large-scale industries—Geographical causes of their existence—the Importance of raw materials—mobility of the factors of production—International Capital market—Industrial finance—Monopolistic tendencies—Trusts and Cartels—Labour organisation—Labour legislation—Industrial disputes—the problem of minimum wage—Arbitration—Joint Industrial Councils—Industrial Education.

Industrial organisation of India—Study of occupations—Importance of agriculture—Agricultural organisation—Systems of land tenures—Agricultural Finance—Co-operation—Agricultural Labour—State and Agriculture.

Cottage Industries—Decline of handicrafts—Growth of large-scale industries—Industrial deficiencies—special advantages—raw material and other natural resources—the problem of power—Industrial labour—efficiency of labour—Labour movement—Labour legislation—Technical education—Foreign capital and management—special study of the development of Cotton, Jute, Iron and Steel, Coal and Leather Industries—Industrial Finance—State and Industry—Fiscal Policy and Indian Industries.

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## CHAPTER XXXV

### INTERMEDIATE EXAMINATION IN SCIENCE

1. The Intermediate Examination in Science shall be held annually in Calcutta and such other places as shall, from time to time, be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Any undergraduate of the University may be admitted to this examination, provided he has prosecuted a regular course of study in one or more colleges affiliated for this purpose for not less than two academical years after passing the Matriculation Examination.

Any student who has passed the Intermediate Examination in Arts may take up the course of the Intermediate Examination in Science at the second year's stage, and after one year's regular course of study appear at the examination. He will be excused attendance and examination in the subject or subjects in which he has already passed at the Intermediate Examination in Arts.

3. Every candidate sent up for the Intermediate Examination in Science by an affiliated college shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the College Examinations and other Tests, and (d) of probability of passing the examination. Every candidate for admission shall send in his application with a certificate in the form prescribed by the Syndicate either to the Registrar or to a local officer recognised by the Syndicate. Every such application must reach the office of the Registrar at least six weeks before the date fixed for the commencement of the examination.

4. A fee of rupees thirty shall be forwarded by each candidate with his application. A candidate who fails to pass or to present himself for examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to any one or more subsequent Intermediate Examinations in Science on payment of a like fee of rupees thirty on each occasion, subject to the provisions of Sections 4B and 4C :

Provided that if a candidate, who has passed the Intermediate Examination in Arts or Science and is prosecuting his studies for a higher examination in a college affiliated to this University, is required by the University to appear in a special subject at the Intermediate Examination in Science, he shall pay a reduced fee of fifteen rupees only.

4A. If a student, after completion of a regular course of study for the examination, does not register himself as a candidate



for, or present himself at, the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the college at which he last studied, or from a Member of the Senate, testifying to his good character during the intervening period, and provided further that, in case the student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate, from the Principal of the said college or of any other affiliated college or from some other authority approved by the Syndicate, to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

If such student does not register himself as a candidate for, or appear at, any of the two examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, on payment of the prescribed fee, provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes a fresh course of study for at least one academical year immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination, he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing at the examination under the second paragraph of this section will be deemed to be non-collegiate students.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who, having been allowed to appear at the examination as a non-collegiate student on account of shortage of attendance at lectures, does not register himself as a candidate for or present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students appearing under the first and second paragraphs above will be treated as non-collegiate students.

4B. If a student appears at the examination and fails, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the college at which he last studied or, with the permission of the Syndicate, from the Principal of any other college affiliated to the University, that he has passed the Test examination held by such a college immediately preceding the examination to which he seeks admission, and a certificate either from the Principal of such a college or from a member of the Senate, testifying to his good character during the intervening period : Provided further that, in case a student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate, from the Principal of the said college or of any other college or from some other authority approved by the Syndicate, to the effect that he has taken a course of practical training during the year immediately preceding the examination at which he presents himself.

Second, third and fourth paragraphs of Section 4A above shall apply to students referred to in this section.

4C. If a candidate is unsuccessful at the examination on account of failure to secure pass marks in one subject only but obtains 40 per cent. of marks in aggregate in other subjects, he may appear for re-examination in that subject alone in which he has failed, on payment of a fee of Rs. 15, at a special supplementary examination, if held by the University, six months after the examination at which he was unsuccessful, or at the next annual examination, but not at both :

Provided that the candidate produces, in addition to the ordinary certificate or certificates required by the Regulations, a certificate from the Principal of the college at which he last studied or from a Member of the Senate, testifying to his good character during the intervening period :

Provided further that, in case a student appears for re-examination in a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said college or of any other college affiliated to the University in that subject or from some other authority approved by the Syndicate, to the effect that he has taken a course of practical training in that subject for a period of not less than three months preceding the examination at which he presents himself.

If the candidate obtains pass marks in the subject at the re-examination, he shall be declared to have passed the examination as a whole.

If such candidate fails to pass in the subject at the re-examination or fails to appear at any of the examination mentioned

in the first paragraph and seeks admission to any subsequent annual examination of the University, he will be required to appear in all the subjects prescribed for the examination, subject to the provisions of Section 4B above.

5. The Intermediate Examination in Science shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

6. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed, arranged in three divisions, the first in order of merit, and the second and third in alphabetical order. Names of candidates who pass the examination under Section 4C above shall be published separately, arranged in alphabetical order, without any division or distinction. Every candidate shall, on passing, receive a certificate in the form entered in Appendix A.

7. The subjects for the Intermediate Examination in Science shall be—

- (1) English .. .. . Three papers.
- (2) One of the following vernacular languages :—Bengali, Hindi, Uriya, Assamese, Urdu, Burmese, Modern Armenian, Modern Tibetan, Marathi, Khasi, Nepali, Maithili, Gujrathi, Telugu, Tamil, Kanarese, Malayalam, Sinhalese, Portuguese, Manipuri, Sindhi, Persian, Punjabi (Gurumukhi).

The Syndicate shall have power to add to this list.

If the vernacular of a candidate is a language not included in the above list, he shall have an Alternative Paper of a somewhat advanced character in English.

- (3) Chemistry.
- (4) Mathematics or Physics.
- (5) Any one of the following subjects :—
  - (i) Mathematics, if not taken up as the 4th subject.
  - (ii) Physics, if not taken up as the 4th subject.
  - (iii) Botany.
  - (iv) Zoology.
  - (v) Geology.
  - (vi) Geography.
  - (vii) Physiology.
  - (viii) Biology.
  - (ix) Anthropology.
  - (x) Psychology.
  - (xi) Junior Military Course. (This subject may be taken subject to the provisions of Chapter LIII-A).

There shall be two papers in Mathematics. In each of the other subjects under sub-sections (3), (4) and (5) there shall be two theoretical papers and one practical paper.

8. Candidates may also be examined, if they so desire, in an additional subject included under (5), provided they have not already taken the subject, or in Art and Architecture or in French or German or Italian, provided also that candidates shall not be allowed to take up Botany or Zoology if Biology has been taken as a Compulsory subject, or Biology if Botany or Zoology has been taken as a Compulsory subject, under Clause 7 (5). In Mathematics, French, German or Italian, there shall be two papers, in Art and Architecture there shall be 3 half papers of 50 marks each and one Practical paper of 50 marks and in any other subject there shall be two theoretical papers and one practical paper.

9. No student shall be permitted to take up Mathematics, Geography or Physiology for the B.Sc. Examination unless he has taken it up for the Intermediate Examination.

No student shall be permitted to take up Physics or Chemistry for the B.Sc. Examination unless he has taken up both Mathematics and Physics for the Intermediate Examination.

No student shall be permitted to take up Psychology for the B.Sc. Examination unless he has taken up any one of the following subjects in the Intermediate Examination :—Psychology, Physiology, Biology or Physics.

No student shall be permitted to take up Botany for the B.Sc. Examination unless he has taken up Botany or Biology for the Intermediate Examination.

No student shall be allowed admission to the course of study for the Bachelor of Architecture Examination unless he has passed the Intermediate Examination in Science with Physics, Chemistry and Mathematics as compulsory subjects and with Art and Architecture as additional subject and secured at least 60 per cent. of marks in the additional subject, provided that the Syndicate will have power, in special cases, to sanction admission, to the Bachelor of Architecture Course, of candidates who have obtained marks less than 60 per cent. but above 50 per cent. in the subject.

10. Each paper shall be of three hours. In English, Vernacular, Mathematics, French, German and Italian, each paper shall carry 100 marks. In each of the other subjects, each theoretical paper shall carry 75 marks and the practical paper 50 marks and of these 50 marks 10 marks shall be set apart for laboratory note books.

In Art and Architecture the distribution of papers and marks shall be as laid down in the syllabus for the subject.

11. There shall be a practical examination in each science subject, and candidates shall be required to pass in the practical portion of the subject as well as in the theoretical portion defined in the Syllabus. Every student who desires to be examined in any such subject must produce a certificate from the Principal

of his College to the effect that he has completed in an affiliated College the corresponding practical course prescribed by the Regulations.

12. The limits of the above subjects for both theoretical and practical work are defined below :—

## ENGLISH, VERNACULARS, FRENCH, GERMAN

As in the Intermediate Examination in Arts.

## MATHEMATICS

### 1. ALGEBRA

Theory of Quadratic Equations and Expressions.

Simultaneous Quadratic Equations, one of which is linear.

Permutations and Combinations.

Variation.

Binomial Theorem for any rational index.

Theory of Indices.

Surds and Complex Quantities.

Logarithms, and their simple applications to Interest and Annuity.

Exponential and Logarithmic series.

### 2. TRIGONOMETRY

Measurement of angles.

Trigonometrical ratios.

Applications of algebraic signs ; angles of any magnitude.

Graphs of trigonometrical ratios.

Elementary trigonometrical formulae and their applications.

Logarithmic sines, cosines, etc.

Relations between the sides and angles of a triangle.

Practical solutions of triangles with application.

Elementary cases of Inverse Functions.

### 3. GEOMETRY

#### (a) *Pure Geometry*

#### Parabola

1. Tracing the curves from definition.

2. Latus Rectum is four times the focal distance of the vertex.

3.  $PN^2 = 4AS \cdot AN$ .

4. The middle points of parallel chords lie on a straight line parallel to the axis.

5. The parameter of any diameter of a parabola is four times the line joining the focus with the vertex of the diameter.

6.  $QV^2 = 4 BS.BV$ .

7. If any chord  $QQ'$  intersects the directrix in  $D$ ,  $SD$  bisects the exterior angle between  $SQ$  and  $SQ'$ .

8. The tangent to the curve at its points of intersection with a diameter is parallel to the system of chords bisected by the diameter.

9. The portion of the tangent at any point intercepted between that point and the directrix subtends a right angle at the focus.

10. The tangent bisects the angle between the focal distance and the perpendicular on the directrix.

11. The sub-tangent is bisected at the vertex.

### Ellipse

1. Tracing the curve from the definition.

2. The ellipse is symmetrical with respect to the minor axis and has a second focus and directrix.

3.  $CS.CX = CA^2$ .

4.  $SP + S'P = AA'$ .

5.  $CB^2 = SA.SA'$ .

6. If any chord  $QQ'$  of an ellipse intersects the directrix in  $D$ ,  $SD$  bisects the exterior angle between  $SQ$  and  $SQ'$ .

7. The middle points of parallel chords lie on a straight line passing through the centre.

8. The tangent to the curve at either end of a diameter is parallel to the system of chords bisected by the diameter.

9. The portion of the tangent at any point intercepted between that point and the directrix subtends a right angle at the focus, and conversely.

10. The tangents at the ends of a focal chord intersect on the directrix.

11. The tangent at any point of an ellipse makes equal angles with the focal distances of the point.

### (b) Elements of Co-ordinate Geometry

Finding out the equations of a straight line, circle, parabola and ellipse in their simplest forms from geometrical properties :

$$\text{For Straight Line } \frac{x}{a} + \frac{y}{b} = 1$$

$$\text{For Circle } x^2 + y^2 = a^2.$$

$$\text{For Parabola } y^2 = 4ax.$$

$$\text{For Ellipse } \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

(c) *Solid Geometry*

1. One and only one plane may be made to pass through any two intersecting straight lines.

2. Two intersecting planes cut one another in a straight line and in no point outside it.

3. If a straight line is perpendicular to each of two intersecting straight lines at their point of intersection, it is also perpendicular to the plane in which they lie.

4. All straight lines drawn perpendicular to a given straight line at a given point is coplanar.

5. If two straight lines are parallel, and if one of them is perpendicular to a plane, then the other is also perpendicular to the same plane.

6. (i) Of all straight lines drawn from an external point to a plane, the perpendicular is the shortest.

(ii) Of obliques, drawn from the given point, those which cut the plane at equal distances from the foot of the perpendicular are equal.

7. The projection of a straight line on a plane is itself a straight line.

8. If a straight line is perpendicular to a plane, any plane passing through the perpendicular is also perpendicular to the given plane.

9. The definition of dihedral and solid angles.

10. The students will be expected to have an idea of the following solids :—

Sphere, Right Circular Cylinder, Right Prism, Rectangular Parallelopipeds, Right Circular Cone, Square and Triangular Pyramids.

11. Expressions (without proof) of the surfaces and volumes of the solids mentioned above.

## 4. ELEMENTARY STATICS AND DYNAMICS

(a) Uniform and uniformly accelerated motion, composition and resolution of velocities, accelerations, etc.

Definition of mass, momentum, force.

Newton's laws of motion.

Units of force and measurement.

Composition and resolution of forces acting at a point.

Simple illustrations of Newton's laws: projectiles, motion of a particle on an inclined plane, motion of two particles connected by a string, uniform circular motion.

(b) Equilibrium of forces.

Resolution and composition of parallel forces in one plane.

Centre of parallel forces.

Centre of gravity. Mass centre.

Reduction of any system of coplanar forces acting on a rigid body to a single resultant force or couple. Conditions of equilibrium for coplanar forces.

Friction.

Machines.

(c) Impulse of a force.

Conservation of linear momentum for a system of particles.

Simple cases of impact of two spherical bodies moving in the same plane.

Work and energy.

Application of the principle of energy to the solution of simple problems.

Two papers shall be set of three hours each, the first being allotted to Algebra, Plane Trigonometry and Geometry, and the second to Elementary Statics and Dynamics.

In all the subjects only such examples and questions may be introduced by way of illustration or explanation as arise directly out of the propositions themselves.

## PHYSICS

### THEORETICAL

The course in Physics shall be mainly experimental. Candidates will be expected to show general acquaintance with the apparatus by which elementary principles of Physics are illustrated and applied.

#### *General Ideas—*

Units of measurement—Lengths, Mass, Time-motion, Velocity Acceleration, Momentum, Force, Moment of a force and couple. Work and Energy.

Laws of Motion.

Translatory motion, circular motion and simple harmonic motion.

Laws of pendulum.

General properties of solids, liquids and gases. Specific gravity.

Elasticity—Hook's Law. Young's modulus. Hydrostatic pressure and its measurement. Equilibrium of floating bodies.

Dalton's Law. Boyle's Law.

Syphon. Lift Pump. Hydraulic Press.

Barometer.

Air Pump.

#### *Heat—*

Expansion of solids, liquids and gases by heat.

Temperature and its measurement.

Quantity of Heat. Specific Heat. Changes of molecular state.



Melting point. Boiling point. Latent heat.  
 Vapour pressure.  
 Formation of Cloud, Fog and Dew.  
 Simple ideas on Hygrometry.  
 Radiation, Conduction and Convection of heat.  
 Heat and work. Conservation of Energy.  
 Working of steam engine and simple petrol engine.

*Light—*

Propagation of light and elementary wave theory.  
 Velocity of light—Romer's method.  
 Formation of shadows, Photometry.  
 Reflection of light at plane and spherical surfaces and the formation of images.  
 Refraction of light across plane and spherical boundaries.  
 Formation of images by single lens.  
 Power of a lens.  
 Eye, vision, colour and colour sensation.  
 Spectacles.  
 Astronomical and Galilean Telescopes.  
 Binoculars, Compound Microscopes.  
 Magic Lantern, Cinematograph and Photographic Camera.  
 Prism, minimum deviation, chromatic dispersion, typical spectra and spectroscopy.  
 Phosphorescence and Fluorescence.

*Sound—*

Production and propagation of sound.  
 Nature of wave motion. Wave front. Wave length.  
 Frequency, amplitude and phase.  
 Velocity of sound in air. Experimental determination.  
 Effect of Pressure and Temperature on Velocity.  
 Reflection and refraction of sound waves.  
 Musical sound and noise—human ear.  
 Pitch and Quality of Tones.  
 Determination of pitch.  
 Tuning forks.  
 Vibration of Strings—Sonometer.  
 Beats.  
 Vibration of air column. Organ Pipe.  
 Phonograph.

*Electricity and Magnetism—*

(1) Magnetism—

Properties of Magnets.  
 Methods of Magnetisation.  
 Magnetic pole. Lines of Force. Magnetic field. Laws of Magnetic force. Magnetic Intensity and Magnetic Induction. Magnetic Moment.

The Earth as a Magnet—Declination, Dip and Intensity.  
Mariner's Compass.

(2) Frictional Electricity—

Nature of electricity. Electron. Electric charge.  
Electrical attraction and repulsion. Lines of force.  
Properties of conductors and insulators.  
Electrical induction. Simple Electroscope.  
The Laws of electric force.  
Electric field ; Strength of field.  
Potential.  
Distribution of charge on conductors.  
Capacity.  
Simple condensers, Leyden jars.  
Specific Inductive Capacity.  
Electrophorus. Influence Machines.  
Electric discharge.

(3) Dynamical Electricity—

Voltaic cells. Electric current.  
Magnetic effect of current.  
Simple Galvanometers—suspended needle and suspended coil types.  
Primary and Secondary batteries.  
Electromotive force ; difference of potential.  
Ohm's law—Resistance.  
Wheatstone's bridge.  
Laws of Parallel and Series resistance.  
Voltmeters and Ammeters.  
Heating effects of current. Joule's Law.  
Laws of Electrolysis.  
Action of magnets on currents and of currents on magnets.  
Burlow's wheel.  
Solenoids, Electromagnets and Electric Bells.  
Electromagnetic induction. Faraday's Laws. Lenz's Laws.  
Electric Telegraphy. Telephone and Microphone.  
Induction coil.  
Thermo-electric couple.  
Simple phenomena of discharge in gases.

PRACTICAL

Length measurement of millimetre rule. Eye-estimation of tenths of a division.

Use of Spirit level and plumb line.

Verniers—linear and angular.

Callipers.

Screw gauges.

Spherometer.

Measurement of areas by plotting on squared paper.

Measurement of angles by protractors.

Verification of the laws of friction.

Time of swing of a simple pendulum. Verification of the formula  $T^2$  varies as  $l$ .

Use of Balance weighing to one centigramme.

Determination of specific gravities of solids and liquids by the hydrostatic balance and Nicholson's hydrometer.

Determination of specific gravity of a liquid by Hare's apparatus.

Reading the Barometric height.

Verification of Boyle's Law.

Determination of fixed points of thermometers.

Simple methods of determining specific heat; Latent heat of fusion of ice.

Verification of the laws of reflection and refraction by pin method.

Measurement of angle of deviation through a prism by pin method.

Use of simple photometers.

Refractive index of glass slab by the pin method.

Focal length of concave mirrors and convex lenses.

Determination of the poles of a bar magnet.

Magnetisation on iron rod and the study of distribution of magnetism along it with iron filings.

Tracing the lines of force in the neighbourhood of a magnet.

Setting up Daniell, Bunsen and Leclanché cells.

Use of simple galvanometers.

Measurement of resistance by a simple form of Wheatstone's Bridge. Verification of Ohm's Law.

The Laboratory note-books of candidates shall be examined and marked by examiners. Note-books which have not been signed at frequent intervals by the Professors under whom the candidates worked will not be accepted.

## CHEMISTRY

### THEORETICAL COURSE

States of aggregation of matter, effect of pressure and temperature on volumes of gases, changes of state, saturation pressure, indestructibility of matter and of energy, chemical and physical changes, enumeration of changes attending chemical

reaction, elements and compounds, balance, weights and measures, common laboratory processes—mixture, solution, crystallisation, distillation, evaporation, precipitation, filtration, decantation, desiccation, combination by weight and volume, atoms and molecules, Avogadro's law, simple examples of determination of atomic weights, laws of chemical combination, the atom and atomic theory, general principles of periodic classification, terminology and nomenclature, symbols, formulæ, equations, decomposition, dissociation, combustion, oxidation, reduction, calculation of formulæ from percentage composition, calculations relating to weight and volume, Faraday's laws of electrolysis, electro-chemical equivalents, valency, acids, bases and salts, neutralisation.

Study of the following :—Hydrogen, oxygen, catalytic agent, ozone, allotropic modifications of elements, water, hydrogen-peroxide, nitrogen, air, ammonia, oxides of nitrogen, nitric acid, sulphur, polymorphs of elements, sulphuretted hydrogen, sulphur dioxide, sulphur trioxide, sulphuric acid, carbon, carbon monoxide, carbon dioxide, coal and its chief products, coal gas, marsh gas, ethylene, acetylene, structure of flame, fluorine, hydrofluoric acid, chlorine, hydrochloric acid, hypochlorous acid, bleaching powder, chlorates of potassium and calcium, bromine, hydrobromic acid, iodine, hydriodic acid, phosphorus, phosphuretted hydrogen, phosphorus trioxide, phosphorus pentoxide, orthophosphoric acid and orthophosphate, silicon, silica, dialysis composition of glass, borax, sodium, potassium, calcium, magnesium, zinc, mercury, copper, silver, aluminium, lead, tin, iron—omitting metallurgical details—and their oxides, hydroxides, chlorides, nitrates, sulphates and carbonates.

### PRACTICAL COURSE

Fitting up of simple apparatus, *e.g.*, a wash-bottle.

Performance of experiments involving solution, filtration, distillation and crystallisation.

Determination of the water of crystallisation of hydrated salts.

Preparation and study of the principal properties of hydrogen and oxygen.

Performance of experiments illustrating the chemistry of fire, air and water.

Performance of experiments involving oxidation and reduction. Simple blow-pipe analysis.

Determination of the equivalent of zinc.

Preparation and study of the principal properties of sulphur dioxide, nitric acid, nitric oxide, ammonia, carbon dioxide, hydrochloric acid, chlorine and sulphuretted hydrogen.

Qualitative analysis of simple substances containing not more than one acid and one basic radical included in the following list:—ammonium, sodium, potassium, calcium, magnesium, zinc, mercury, copper, silver, aluminium, lead, tin, iron, and their oxides and hydroxides, chlorides, nitrates, sulphides, sulphates and carbonates.

Elementary Acidimetry and Alkalimetry.

Use of the chemical balance.

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## BOTANY

*(Theoretical)*

(a) Elementary General Morphology, including a study of the outline of life-history of selected plants, to illustrate the gradual ascent in complexity of structure and reproductive cycle from the lowest algae and fungi to the phanerogams—to be studied with reference to the types to be prescribed from time to time.

(b) Elementary Histology: Structure and formation of cells, tissues and tissue systems. Structure of roots, stems and leaves; secondary growth.

(c) Elementary Plant Physiology: Absorption of water; movement of water and gases within the plants; chemistry of the plant-body; food materials of plants, their sources and form; photosynthesis; digestion; assimilation; transpiration; respiration; metabolism; reserve materials. Growth; influence of external conditions on growth. Irritability. Reproduction, sexual and asexual.

(d) The principles of Classification as illustrated by common plants; outlines of classification. Referring plants to their families.

(e) Elementary facts of Ecology.

*(Practical)*

Use of the simple and compound microscopes. Dissection of flowers and floral parts. Referring plants to the families to be prescribed from time to time. Microscopic examination of the principal plant tissues. Microchemical reactions of cellulose and its modifications and the cell contents.

The course shall include the description and drawing of parts of plants and sections.

Demonstration of simple physiological experiments bearing on the theoretical portion by the teachers.

Candidates will be required to study the outlines of the life-history of the following :—

Oscillatoria, Spirogyra, Vaucheria, Oedogonium.

Yeast, Mucor, Agaricus.

Moss, Fern, Equisetum, Selaginella.

*Field work* : Examination of plants in the field with reference to the syllabus in Morphology and Classification.

*Types prescribed* :—

- (1) Gramineae : Oryza ; Zea ; Cynodon.
- (2) Liliaceae ; Allium ; Asparagus.
- (3) Nymphaeaceae ; Nymphaea and Nelumbium.
- (4) Capparidaceae ; Gynandropsis ; Cleome.
- (5) Cruciferae ; Brassica ; Raphanus.
- (6) Leguminosae ; Pisum ; Sesbania ; Cassia ; Caesalpinia ; Mimosa ; Acacia.
- (7) Euphorbiaceae ; Ricinus ; Jatropha ; Euphorbia
- (8) Malvaceae ; Hibiscus ; Gossypium.
- (9) Apocynaceae ; Vinca ; Nerium.
- (10) Labiateae ; Ocimum ; Leonurus.
- (11) Solanaceae ; Solanum ; Datura.
- (12) Cucurbitaceae ; Cucurbita ; Lagenaria.
- (13) Compositae ; Helianthus ; Tridax.

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## PHYSIOLOGY

### DISTRIBUTION OF PAPERS

*Theoretical Paper I*—Characteristics of Life—Blood and its Circulation, Respiration, Kidney and Secretion of Urine, Skin.

*Theoretical Paper II*—Nervous System, Sense Organs, Endocrine Organs, Alimentation, Elementary Biochemistry—Nerve-Muscle Physiology.

*Practical Paper*—Histology and Elementary Biochemistry.

(*Theoretical*)

#### 1. Introduction.

Characteristics of Living Matter—amoeba.

#### 2. Structural Basis of Body.

Cell—its structure and functions.

Tissues and Organs.

General plan of the Human Body.

3. **Biochemical Basis of Life.**  
     Nitrogen and Carbon Cycle.  
     Chemical composition of Living Matter—Elementary Chemistry of Proteins, Carbohydrates, and simple Lipides.
4. **Alimentation—Nutrition—Dietetics.**  
     The Alimentary Canal.  
     Digestion in mouth, stomach and intestines.  
     The composition and action of digestive juices.  
     Liver and its functions.  
     Absorption of digested foodstuffs from the alimentary canal—Fate of absorbed foodstuffs.  
     Elementary knowledge of chemical composition of Foods.  
     Nutrition of an individual—Normal diet.
5. **Blood and its Circulation.**  
     Blood—its general composition.  
     Life history of red blood corpuscles and of white blood corpuscles—Coagulation of blood.  
     The Circulatory System.  
     Course of circulation—Proofs of circulation.  
     Anatomy of Heart—Characteristics of cardiac muscle.  
     Cardiac cycle—Action of valves—Heart sound—Nervous regulation of heart—Apex beat.  
     Vascular System—Structure of arteries, capillaries and veins.  
     Elementary principle of circulation—Arterial blood pressure—Pulse—Velocity of blood flow—Vasomotor control.  
     Lymph—Composition, formation and function of lymph.  
     Spleen and its functions.
6. **The Respiratory System.**  
     The organs of Respiration.  
     Mechanics of respiratory movements Quantity of air breathed—Chemistry of respiration—Inspired air—Expired air—Alveolar air—External and internal respiration—Regulation of breathing.  
     Asphyxia and apnoea.  
     Artificial respiration—Schafer's method.
7. **Kidney.**  
     Principal constituents of Urine.  
     Elementary knowledge of structure of Kidney and its circulation.  
     Formation of urine.
8. **Skin and the Regulation of Temperature.**  
     Skin—its structure and functions.  
     Regulation of body temperature.

9. **Physiology of Movement.**

Various kinds of joints and movements—Liver action.

Contraction of muscles.

Method of recording muscular contraction.

10. **The Nervous System.**

General view of the nervous system.

The Neurone.

Afferent and efferent nerves.

Spinal cord—its structure—Anterior and posterior roots—Functions of spinal cord—Reflex action.

Cerebellum and Rolandic area of Cerebrum.

The Cranial nerves and their important functions.

11. **The Sense Organs.**

Cutaneous sensations.

Sensations of Smell and Taste.

Vision—Anatomy of the Eye—The optical system—

Errors of refraction—Function of iris—Mechanism of accommodation.

Hearing—Anatomy of the Ear—Conduction of sound waves from air to internal ear.

12. **The Endocrine Organs.**

Elementary knowledge of structure and functions of

Thyroid, Pituitary Body, Pancreas and Suprarenal.

(*Practical*)

**HISTOLOGY**

*The Microscope*—its use and care.

Examination of Milk, Unicellular organisms and Starch granules.

Examination of Frog's blood and of Human blood—Staining by irritation.

Preparation, staining and examination of Blood Film.

Preparation and examination of elementary tissues—Squamous, Columnar, Cubical and Ciliated epithelium, Muscles, Medullated nerve fibres.

Preparation of Areolar and Adipose tissues by spreading.

Examination of Bones, Cartilage and Liver.

**BIOCHEMISTRY AND BIOPHYSICS**

Simple tests and identification of Starch, Dextrin, Cane Sugar, Glucose, Lactose and Maltose, Proteins and Peptone. Emulsification and saponification of Fat.

Salivary digestion.

Examination of Milk, Flour and Egg.

Separation of albumin from globulin.



Demonstrations, such as Capillary circulation in frog's mesentery—Myographic recording of muscular contraction—Enumeration of Corpuscles of Blood and estimation of Haemoglobin—Cutting of sections.

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## ZOOLOGY

### THEORETICAL COURSE

The scope of Zoology—Disinction between plant and animal. Broad sub-divisions of the animal kingdom. Outlines of the theory of Organic Evolution. The general morphology and physiology of the cell; cell division. Simple tissues.

The general characters of the Protozoa :—types—*amoeba*, *Paramecium*.

The general characters of the Coelenterata :—type—*Hydra*.

The general characters of the Annelida :—type—*Earthworm*.

The general characters of the Arthropoda :—types—*Prawn*, *Cockroach* (gross anatomy).

The general characters of the Mollusca :—type—*Fresh-water mussel* (gross anatomy).

The general characters of the Chordata and broad sub-divisions into classes.

The general anatomy of the soft parts of a common Teleost.

Structural details of *Frog* or *Toad* and outline of life-history of the common *Frog*.

General characters of the Mammalia :—type—*Guinea-pig* or *Rabbit* (gross anatomy).

The morphology of the types mentioned should be treated in an elementary way except in the case of *Frog* or *Toad*.

### PRACTICAL COURSE

The use of compound microscope.

A general acquaintance with histology of simple animal tissues.

Microscopic examination of :—*Amoeba*, *Paramecium* and *Hydra*, sections of *Earthworm* (*Pheretima*) and of the organs of *Frog* or *Toad*.

Microscopic examination of the types mentioned in the theoretical course.

Dissection of digestive and nervous system of :—*Earthworm*, *Prawn*, common Teleost and *Frog* or *Toad*.

Dissection of the circulatory and reproductive systems of the Prawn, common Teleost and Frog or Toad.

General examination of the viscera of the Guinea-pig and dissection of its vascular system.

Distribution of theoretical papers will be as follows :—

First paper .. .. Invertebrata.

Second paper .. .. General and Vertebrata.

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## GEOLOGY

### THEORETICAL COURSE

Candidates are required to possess an elementary knowledge of the following :—

The object of Geology and also of its various branches.

The earth as a planet ; its origin ; the nature of its atmosphere, crust and interior.

Physical characters of the continental plateaux and oceanic depressions.

Effects of temperature changes on rocks. The geological work of air, water, ice and life. Crustal movements and deformations ; common structural features. Types of mountains. Nature and origin of earthquakes and volcanoes ; their distribution and effects. Volcanic products. Hot springs and geysers.

Elements of crystallography. The principal physical characters and chemical composition of the minerals in the following list :—

Diamond, graphite, sulphur, gold, galena, sphalerite, cinnabar, chalcopyrite, pyrite, halite, fluorite, quartz, opal, corundum, haematite, spinel, magnetite, pyrolusite, psilomelane, braunite, bauxite, calcite, dolomite, the feldspar, augite, hornblende, garnet, olivine, tourmaline, muscovite, bistite, talc, kaolinite, apatite, barite, gypsum.

Distinction between igneous, sedimentary and metamorphic rocks. Modes of occurrence of igneous rocks. A simple classification of igneous rocks.

Formation and consolidation of different types of sediments. False bedding, overlap and unconformity.

The factors and kinds of metamorphism.

Description of rocks in the following list :—Granite, syenite, diorite, gabbro, peridotite, rhyolite, trachyte, andesite, dolerite, basalt, pegmatite, tuffs and ashes, shale, sandstone, conglomerate, limestone, peat, lignite, coal, tufa, sinter, gneiss, schist, slate, marble, quartzite and laterite.

The more common uses, if any, of the minerals and rocks in the above lists.

Preservation of plant and animal remains as fossils and their value in historical geology. Sub-divisions of geological time. Standard stratigraphical scale. Leading palaeontological features of Palaeozoic, Mesozoic and Cainozoic eras.

Physical features of India. Elementary knowledge of the chief stratigraphical units of India such as Archaean, Purana, Dravidian and Aryan eras.

### PRACTICAL COURSE

Determination of hardness and specific gravity of mineral specimens. Recognition in hand specimens of minerals and rocks mentioned in the above lists. Observation of general geological features in the field. Determination of dip and strike. Interpretation of simple geological maps and drawing of sections.

Recognition of the following rock-forming minerals in thin sections under the microscope—Quartz, orthoclase, plagioclase, muscovite, biotite, augite, hornblende, garnet, olivine and tourmaline. Determination of symmetry in models of simple crystals.

Recognition of the following genera of fossils :—Gangamopteris, Glossopteris, Nummulites, Zaphrentis, Calceola, Monograptus, Cidaris, Micraster, Productus, Spirifer, Arca, Cardita, Hippurites, Ostrea, Bellerophon, Turritella, Physa, Orthoceras, Nautilus, Ceratites, Belemnites, Paradoxides, Calymene, Agnostus.

Laboratory and field note-books shall be inspected and marked by the examiners, and if they are found to be unsatisfactory, the candidate will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidate worked will not be accepted.

The list of minerals, rocks and fossils in this syllabus may be modified by the Syndicate on the recommendation of the Board of Studies in Geology and Mineralogy.

## GEOGRAPHY

### THEORETICAL COURSE

#### *Paper I*—Human, Economic and Regional Geography—

Modes of life in typical areas : environmental influences on group life : man as a geographical factor ; general distribution of population ; general conditions of life ; means of sustenance in typical areas ; distribution of occupation ; human dwellings ; village types ; classification of towns.

Natural regions of the world on the basis of relief, climate and vegetation. The outlines of the geography of the continents : political divisions ; surface relief ; river systems ; climatic and weather conditions ; vegetation and animal life ; general conditions of agricultural, industrial and commercial life ; towns, (Causal relations amongst the foregoing points relating to each continent should be brought out as far as practicable.)

The influence of climate, relief and soil conditions on the economic activities—agriculture, commerce and industry ; rice and wheat, their distributions ; other cereals ; oil seeds ; fruit trees ; the sugar-cane ; jute ; tea, coffee and cocoa ; potatoes and vegetables ; dairy produce ; forest products ; important fisheries of the world ; exploitation of minerals ; means of transport.

India : A general study of India with a fuller treatment of either Bengal or Assam in the light of the foregoing principles of Geography.

### *Paper II*—The Physical Basis of Geography —

The movements of the earth and the resulting diurnal and seasonal changes.

Distribution of land and water ; relief of the land and of the ocean floor ; the crust of the earth—types of minerals, rocks and soils ; study of typical areas to illustrate the combined influences of erosion, faulting and folding and igneous intrusion.

The atmosphere ; distributions of temperature, pressure, winds and rainfall with reference to climatic regions.

Types of oceans, seas and lakes, movements of oceans.

Differentiation in the earth's vegetation due to climatic factors ; edaphic formations.

General characters of different types of animals.

### PRACTICAL COURSE

Simple meteorological observations ; Maximum and minimum thermometer ; dry and wet bulb thermometer ; barometer ; rain gauge. Plotting of meteorological data.

Map Projection—Drawing of maps on cylindrical equal area projection : comparative study of maps drawn on simple projections.

Conventional signs used in survey maps ; Interpretation of topographical maps : small scale (1/M) and large scale (1") maps of typical areas of India.

Drawing and interpretation of climatological and economic maps.

Surveying : Simple methods of surveys including the use of the chain.

## BIOLOGY

### THEORETICAL COURSE

(1) Characteristic of the living matter. Difference between living and non-living. Difference between animal and plant.

(2) The physical and chemical nature of protoplasm (treated in an elementary manner.) Cells, animal and vegetable, their structures and functions. Cell division. Tissues and tissue-systems in animals and plants.

(3) Nutrition and growth, circulation of nutritive materials, respiration, excretion, secretion and the storage of reserve material in animals and plants. Photosynthesis in plants.

(4) Stimulus and response in plants and animals. Movements in plants and animals. Nervous mechanism in animals.

(5) Chemical co-ordination.

(6) Reproduction, asexual and sexual. Parthenogenesis. Alternation of generations. The formation of the embryo in the fowl.

(7) Outlines of the theory of organic evolution.

(8) Elementary study of the following types :—

Amoeba—Monocystis—Hydra—Lecch—the freshwater prawn (Palaemon)—Bhekti—Toad—Guinea-pig.

Yeast—Mucor—Spirogyra—Moss—Fern—Pea plant—Maize plant.

### PRACTICAL COURSE

Candidates shall be required to dissect and examine microscopically the above types. They must be prepared to examine and describe the parts of various flowering plants in simple technical terms.

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## ANTHROPOLOGY

### THEORETICAL COURSE

#### *Paper I*

Outlines of Physical Anthropology and Pre-history.

Man's place amongst the mammals.

An elementary knowledge of the human skeleton.

Definition of a fossil. Definition of geological strata. Main sub-divisions of geological time.

Main stages in Pre-history—Palaeolithic and Neolithic.

General outline of the early types of man.

Geographical distribution of the human races. Principal racial types and chief linguistic families in India.

### *Paper II*

#### *Outlines of Social Anthropology*

Development of social organisation—family, clan, marriage

Economic pursuits of primitive hunters, fishers, herdsman and agriculturists and the main traits of their material culture

Outlines of beliefs in ghosts, spirits, supreme and superior beings.

Magic and Fetishism.

### PRACTICAL COURSE

Identification of important cranial points and principal bones of the human body. Identification of photos and specimens illustrative of the life of primitive peoples of India.

Elementary anthropometry, stature, head length, head breadth; cephalic index, nasal length, nasal breadth, nasal index.

Observations of hair and skin colour.

(Special reference is to be made wherever possible to India in general and Bengal in particular.)

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### PSYCHOLOGY

The Course shall consist of the following parts :

#### A. Theoretical—

1. General Psychology . . . . . *First Paper*
2. Genetic and Abnormal Psychology *Second Paper*

#### B. Practical.

### THEORETICAL COURSE

#### *Paper I*

#### *General Psychology*

1. Definition of Psychology, Relation of Psychology to other Sciences.

2. General idea of the nervous system. Relation of Body and Mind. Interactionism and Psycho-physical parallelism.

3. Methods of Psychology : Observation, Introspection, Experimental and Genetic methods.

4. Problems and Scope : General, Animal, Child, Abnormal, Educational, Vocational and Industrial Psychology.

5. Mental Elements : Sensation, Image, Affection.

6. Sensations : General facts regarding visual, auditory, olfactory, gustatory, cutaneous, kinaesthetic and organic sensations. General knowledge of the sense organs.

7. Intensity : Weber's Law.

8. Image : Sensation and Image. Image-types, Synaesthesia.

9. Affection : Pleasantness, Unpleasantness. Experimental Investigation.

10. Attention : Level, Range, Duration.

11. Perception : Sensation and Perception. General facts regarding spatial and temporal perceptions and perception of movement. Illusions and Hallucinations.

12. Memory : Memory image. Association : Conditions of association. Forgetting and improvement of memory.

13. Learning : Types of learning. Learning and habit. Laws of Memory and Learning.

14. Imagination : Memory and Imagination. Image of imagination. Forms of imagination.

15. Thought : Relation of Thought to Memory, Imagination, etc. Nature of Thought. Belief. Thought and Language.

16. Action : Reflex, Instinctive, Voluntary and other forms of action. Reaction time.

17. Emotion : Emotion and Instinct ; their rôle in life. Feeling and Emotion, Organic changes in Emotion, specially in anger and fear.

18. Intelligence : Nature of Intelligence. A general idea of Binet-Simon tests. I. Q.

19. Idea of Self. Unity of Mental life.

## Paper II

### *Genetic and Abnormal Psychology*

#### A. Genetic Psychology—

1. Definition. Scope. Methods.

2. Beginnings of life. Characters of living organisms.

3. Characteristic behaviours of amœba, paramœcium, earthworm, hydra, starfish, bees, birds, dogs and apes.

4. Nervous organisation and its relation to consciousness : Criteria of consciousness.

5. General idea of evolution of bodily structure and mind.
  6. Instinctive and intelligent activities.
  7. The Child : (a) Original equipments and capacities of the child. Sense organs, and organs of response. Reflexes. Instincts and emotions in children.  
(b) Perception of colour, form, number, distance and time.  
(c) Imitation, curiosity, play and love.
  8. Learning of children and apes.
- B. Abnormal Psychology—
1. Normal and abnormal mind. Signs of mental disorder.
  2. Mental deficiency. Grades. Practical problems.
  3. Somnambulism. Multiple personality. Hypnotism.
  4. Repression. Conflict and modes of resolution of conflict.
  5. Errors. Day dreams. Dreams.
  6. Description of anxiety, neurosis, obsessional psycho-neurosis and paranoia.
  7. Mental adjustment.

#### PRACTICAL COURSE

1. Vision : Determination of the near and far points.  
Double vision.  
Stereoscopic vision.  
After images : Positive and Negative.  
Colour contrast.  
Laws of colour mixture.  
Demonstration of the blind-spot. Campimeter.  
Demonstration of retinal sensitivity for colours.
2. Cutaneous sensations : Determination of touch spots, temperature spots and pain spots.
3. Determination of the aesthesiometric index.
4. Illusion : Muller-Lyer illusion, Aristotle's experiment.  
Size-weight illusion.
5. Feeling : Method of impression—colour preference.  
Method of expression—pneumograph.
6. Determination of the reaction time : Group method.  
Vernier.
7. Determination of image type.
8. Memory span with nonsense syllables. Memorisation by learning method.
9. Word association experiment.

*N.B.—Students must be trained in introspection.*



The Laboratory note-books of candidates shall be examined and marked by examiners. Note-books which have not been signed at frequent intervals by the Professors under whom the candidates worked will not be accepted.

## ART AND ARCHITECTURE

A general training planned to develop Taste and Sensibility through Colour Sense, to develop the power of Expression in various media and, at the same time, to increase Mechanical Proficiency in Draughtsmanship, will be given through brief lectures and written notes, for which there will be no examination.

An elementary knowledge of the principles of Machine production—an inherent character of Artistic Industrial Design of simple objects is to be given in a popular manner for which there will be no examination.

### I. Positive Basis of Arts (one-half paper—50 marks).

Elementary Principles of Biological Evolution.

Outlines of Physical and Social Anthropology and Social Psychology.

### II. Technical Drawing (one-half paper—50 marks).

The principles of Draughtsmanship. Significance of Plan, Elevation and Section. Preparing drawings of simple objects. Use of Scales, Drawing Instruments, Curves, etc. Lettering and Typography.

The effect of Light and Shade in objects of different shapes and textures, shades and shadows, high lights and tones. Drawing from Plaster casts.

The theory of colour : spectrum colour harmony and contrast. The effect of textures and light on colour. Rendering in wash. Colour proportions.

### III. Free hand Life drawing (one-half paper—50 marks).

Rudimentary history and aesthetic appreciation of Fine Arts. Elements of Architectural Forms and Architectural Sculpture. Drawing human figures from life. Simple anatomical drawing. Quick sketching of living subjects both at rest and in motion.

Evolution of two dimensional designs from Simple line leading to complex repeating patterns. Exercises in design combined with texture. Their applications to the Decoration of two and three dimensional designs. Three Dimensional rendering of 'Still Life' groups of objects by means of colour drawings in various media. Imaginative composition. Landscape drawing and painting.

## IV. Practical (50 Marks).

Modelling and Carving. Inscribing in Terracotta in plastic state.

Ten marks will be reserved for outdoor sketching of landscape and simple architectural objects. The sketches which have not been signed by the teacher under whom the candidates worked will not be accepted.

The detailed syllabuses in the subject may be modified and books prescribed to indicate the standard of knowledge required from time to time, by the Syndicate, on the recommendation of a body of five experts to be nominated by the Syndicate for the first three years after the institution of the Course and thereafter on the recommendation of the Board of Studies in Architecture.

## GENERAL

1. In order to pass the Intermediate Examination in Science a candidate must obtain—

In English .. .. .	108 marks
In the Vernacular or the Alternative paper ..	36 marks
In Mathematics .. .. .	60 marks
In each of the remaining compulsory subjects—	
In the two theoretical papers .. .. .	40 marks
In the practical paper .. .. .	20 marks
And in the aggregate of the compulsory subjects	340 marks

2. In order to be placed in the first division a candidate must obtain 500 marks.

In order to be placed in the second division 400 marks.

If a candidate has passed in the compulsory subjects and in the aggregate, the marks in excess of 60 obtained by him in the optional subject, if any, shall be added to his aggregate, and the aggregate so obtained shall determine his division and his place in the list :

Provided that in any Science subject and in ' Art and Architecture ' such marks shall not be added unless the candidate has obtained at least 40 marks in the theoretical papers and 20 marks in the practical paper.

3. Any candidate, who has failed in one subject only, and by not more than 5 per cent. of the full marks in that subject, and has shown merit by gaining 50 per cent. or more in the aggregate of the marks of the examination, shall be allowed to pass.

4. If the Examination Board is of opinion that, in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall

forward the case to the Syndicate with a definite recommendation and the reason for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

5. Candidates, who, after passing the Intermediate Examination in Arts, appear for the Intermediate Examination in Science, shall be required, in order to pass, to obtain 36 per cent. in each subject for which they present themselves in the latter examination :

Provided that in a Science subject they must obtain pass marks both in the theoretical papers and in the practical paper.

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## CHAPTER XXXV-A

### INTERMEDIATE EXAMINATION (SCIENCE) IN AGRICULTURE

1. The Intermediate Examination (Science) in Agriculture shall be held annually in Calcutta and such other places as shall, from time to time, be appointed by the Syndicate, the approximate date to be notified.

2. Any person may be admitted to this examination provided he has prosecuted a course of study in one or more colleges affiliated for this purpose for not less than two academical years after passing the Matriculation Examination.

Any student who has passed the Intermediate Examination in Science or Arts may take up the course of the Intermediate Examination (Science) in Agriculture at the second-year stage and he will be excused attendance and examination in the subject or subjects in which he has already passed at the Intermediate Examination in Science or Arts.

3. Every candidate sent up for the Intermediate Examination (Science) in Agriculture, shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the college examinations and other Tests and (d) of probability of passing the examination. Every candidate for admission shall send in his application with a certificate in the form prescribed by the Syndicate either to the Registrar or to a local officer recognised by the Syndicate. Every such application must reach the office of the Registrar at least six weeks before the date fixed for the commencement of the examination.

4. A fee of Rs. 30 shall be forwarded by each candidate with his application. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass or appear at the examination immediately following the completion of his course may be admitted to any one or more subsequent Intermediate Examinations (Science) in Agriculture on payment of the prescribed fee of Rs. 30 on each occasion, subject to the provisions of Section 4B.

4A. If a student, after completion of a regular course of study for the examination, does not register himself as a candidate for or present himself at the examination immediately succeeding such completion he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required by the Regu-

lations, a certificate from the Head of the institution at which he last studied or from a Member of the Senate, testifying to his good character during the intervening period, and provided further that he also produces a certificate from the authorities of the institution concerned to the effect that, he has taken a course of Practical Training in the laboratory and also in the farm during the year immediately preceding the examination at which he presents himself.

If such student does not register himself as a candidate for, or appear at, any of the two examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, on payment of the prescribed fee, provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes a fresh course of study for at least one academical year immediately preceding the examination at which he presents himself.

If such a student desires to present himself at any subsequent examination he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing at the examination under the second paragraph of this Section will be deemed to be non-collegiate students.

If a student after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who having been allowed to appear at the examination as a non-collegiate student, on account of shortage of attendance at lectures, does not register himself as a candidate for or present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students appearing under the first and second paragraph above will be treated as non-collegiate students.

4B. If a student appears at the examination and fails, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate from the Head of the institution at which he last studied or, with the permission of the Syndicate, from the Head of any other institution affiliated to the same standard that he has passed the Test examination held by such an institution immediately preceding the exa-

mination to which he seeks admission and a certificate either from the Head of such an institution or from a Member of the Senate testifying to his good character during the intervening period: Provided further that he also produces a certificate from the Head of such an institution to the effect that he has taken a course of practical training in the laboratory and also in the farm during the year immediately preceding the examination at which he presents himself.

Second, third and fourth paragraphs of Section 4A above shall apply to students referred to in this section.

5. The Intermediate Examination (Science) in Agriculture shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

6. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed, arranged in three divisions, the first in order of merit, and the second and third in alphabetical order. Every candidate shall, on passing, receive a certificate in the form entered in Appendix A.

7. Students having passed the Intermediate Examination (Science) in Agriculture will qualify themselves for admission into the B.Sc.Ag. Course. They will also be eligible for admission into B.A. or B.Sc. Course provided that they comply with the relevant Regulations.

8. The subjects for the Intermediate Examination (Science) in Agriculture shall be—

#### GROUP I

##### *Basic Sciences*

		Theoretical Papers	Practical Papers
(1)	Mathematics ..	1(half)	Nil
(2)	Physics ..	2 halves	1
(3)	Chemistry—Inorganic and Organic.	2	1
(4)	Botany and Zoology ..	2	1 (in 2 halves)

#### GROUP II

Agricultural Economics and Rural Sociology.	2 halves	Nil
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#### GROUP III

##### *Farm Technology :*

(1)	Crop Husbandry ..	1	}	1
(2)	Animal Husbandry and Farm Management.	1		

#### GROUP IV

##### *Languages :*

Bengali and English Composition.	1 (in 2 halves).	Nil
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*Optional subjects :*

Any one of the following subjects may be offered as an additional subject :—

(a) Agronomy	}	2	1
(b) Horticulture			
(c) Dairying			
(d) Poultry Keeping			
(e) Fisheries			

The Syndicate shall have power to modify this list.

9. Each paper shall be of three hours. Each theoretical paper under Group I, Group III and the additional subjects, except that on Mathematics and Physics, shall carry 75 marks and each Practical paper 50 marks, and of these 50 marks 10 marks shall be set apart for Laboratory note books and records of work. The papers on Mathematics and Physics, Economics and Rural Sociology and Language shall carry 50 marks for each half paper and 50 for practical wherever it occurs.

10. In order to pass the Intermediate Examination in Agriculture a candidate must obtain in—

**GROUP I**

Mathematics .. ..	15 marks.
Physics .. ..	30 marks in Theoretical and 20 in Practical.
Chemistry—Inorganic and Organic.	In the two Theoretical papers. 20 marks each. In the Practical paper. 20 marks.
Botany and Zoology ..	In the two Theoretical Papers. 20 marks each. In the Practical paper. 10 marks in each half.

**GROUP II**

Agricultural Economics and Rural Sociology.	.... 30 marks.
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**GROUP III**

Crop Husbandry and Animal Husbandry and Farm Management.	In the Theoretical papers. 20 marks each. In the practical papers. 20 marks for the combined paper.
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**GROUP IV**

Language .. ..	(15 marks in each half) 30 marks
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And in the aggregate of all the compulsory subjects. 340 marks

In order to be placed in the First Division a candidate must obtain 500 marks.

In order to be placed in the Second Division 400 marks.

A candidate who passes in all subjects and in the aggregate but obtains less than 400 marks shall be placed in the Third Division.

If a candidate has passed in the Compulsory subjects and in the aggregate, the marks, in excess of 60 obtained by him in the optional subject, if any, shall be added to his aggregate, and the aggregate so obtained shall determine his division and his place in the list :

Provided that such marks shall not be added unless the candidate has obtained at least 40 marks in the Theoretical papers and 20 marks in the Practical paper.

11. Any candidate, who has failed in one subject only, and by not more than 5 per cent. of the full marks in the subject, and has shown merit by gaining 50 per cent. or more in the aggregate of the marks of the examination, shall be allowed to pass.

If the Examination Board is of opinion that, in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reason for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

12. The Syllabuses in the different subjects (both Theoretical and Practical) are given below. The syllabus may be revised from time to time, and books prescribed or recommended when necessary, by the Syndicate on the recommendation of a special committee appointed for the purpose.

## MATHEMATICS

One paper—50

Elementary mensuration of surface and solids—area of plane surface as applied to the measurement of land. Volumes of solid, regular and irregular, applied to the measurement of stacks, sheds, heaps, and the like. Capacity of tanks, wells and silo pits.

Graphic methods—Use of squared paper, scale of representation. Plotting of points; linear graphs; independent and dependent variables; graph of function; representation of algebraic functions; graphic solution of linear equations; reading off of values of graphs; interpolation.



Simple Series, Surds, Indices, Binomial Theorem and Series, Exponential Theorem and Series, Logarithms—all treated in an elementary manner.

Elements of Biometry—The nature and use of statistical methods. Collection of data. Characteristics and limitations. Representativeness and adequacy of sampling. Classification and tabulation. Frequency distributions and their graphical representation. Some important types of frequency curves. Kinds of average and measures of central tendency, measures of dispersion, skewness and kurtosis, co-efficient of variability, bivariate frequency distribution and bivariate normal surface co-efficient of correlation regression.

## PHYSICS

### *Theoretical Course—75*

Units of measurements—lengths, angle, area, volume, velocity. Acceleration, Momentum, Force, Work and Energy, Laws of motion, Laws of pendulum, Law of Gravitation, General properties of solids, liquids and gases. Elasticity, Hooks, Lands, Young's modulus, Simple machines, Archimedes principle, Specific gravity, Atmosphere, Soil Atmosphere, Air pressure, Simple barometer, Air pressure machines, Suction pump, lift pump, force pump, syphon, Air pump, condensing pump and pressure gauge.

Heat—Expansion of solids, liquids and gases. Temperature and its measurements. Specific heat, calorimetry, changes of molecular state. Melting point, boiling point, latent heat. Formation of cloud, fog and dew. Rain and rain gauge. Transmission of heat—conduction, convection and radiation. Heat and work. Conservation of Energy. Working of steam engine and simple petrol engine.

*Optics*—(i) Light, Propagation of light, elementary wave theory, Velocity of light, Romer's Method.

(ii) Reflection and refraction of light at plain and spherical surface, Formation of image, eye, vision, prism and cosmetic dispersion, spectra and spectroscopy, colour, Spectacles.

(iii) Simple optical instruments, *e.g.*, telescope, microscope (Binocular), Magic lantern, Camera.

Production and propagation of sound, nature of wave motion, velocity of sound, pitch and quality, musical sound, vibration of strings, sonometer.

Magnetic energy—Magnets; magnetisation; compass, magnetic fields, earth as a magnet.

Electric energy—Electrification by friction, Electron of electric charge, insulators, conductors; electricity generated by chemical action; magnetic effect of current; principles of the dynamo.

Electro magnets ; resistance ; Ohm's law ; Laws of Electrolysis, Electro-magnetic induction, Electric telegraphy, telephone, microphone. Units of measurement, transformation of electric energy into heat, light and power ; practical acquaintance with galvanometers, voltmeters and ammeters.

*Practical Course—25*

Length measurement of milimetre rule. Verniers—Linear and angular, Callipers. Measurement of areas by plotting on squared paper. Measurement of angles by protractors. Determination of specific gravities of solids and liquids. Reading of Barometric height. Determination of specific heat. Latent heat of fusion of ice. Demonstration of simple optical instruments. Magnetisation of needles and determination of their poles. Charting of lines of force due to a magnet in different positions. Construction of a simple cell and use of the simple galvanometer.

## CHEMISTRY

### *Theoretical Course*

#### PAPER I

#### Inorganic Chemistry

Measurements, Chemical balance.

Atoms and molecules, symbols, equations, formulas ; chemical calculations.

General laws for gases. Avocadro's hypothesis. Determination of density of gases and vapours. Determination of atomic, molecular and combining weights. Gas mixture diffusion, dialysis, osmosis, sublimation.

Classification of elements—

Hydrogen : Preparation and properties.

Oxygen : preparation and properties, oxides.

Acids, bases and salts. Oxidation and Reduction.

Electrolytes, electrolysis, Faraday's laws, Ions.

Water, Solution, Crystallisation, efflorescence and deliquescence, distillation.

Natural water ; hardness, softening and purification.

Nitrogen Ammonia. Oxides nitrogen, nitric acid and nitrates.

Atmospheric nitrogen and its fixation. The nitrogen cycle.

Carbon. Carbon dioxide and carbonate, carbon monoxide, Combustion, flame, safety lamp.

Chlorine, bromine and iodine. Hydrochloric, hydrobromic and hydroiodic acids and their salts.

Sulphur, Sulphur dioxide and sulphur trioxide. Sulphuric acid, sulphuretted hydrogen and their salts.

Phosphorus. Oxides of phosphorus. Phosphoric acid and its salts.

Silicon, silica and the silicates. Boron, borax.

The following metals and their important compounds :—sodium, potassium, calcium, magnesium, aluminium, iron, lead, copper, gold, silver, mercury, manganese, zinc.

## PAPER II

### *Organic Chemistry*

Carbon compounds, aliphatic and aromatic. General properties and behaviour. Closed and open chains; saturated and unsaturated compounds.

Hydrocarbons—methane, ethane, ethylene and acetylene. Halogenation of hydrocarbons. Chloroform, iodoform.

Methyl and ethylalcohols. Glycerine.

Ethylether.

Formaldehyde, acetaldehyde, acetone.

Acids—formic, acetic and fatty acids. Fats and oils, soaps. Oxalic, lactic, tartaric and citric acids.

Carbohydrates,—canesugar, dextrose, fructose, lactose, starch, cellulose.

Acetamide. Urea, aminoacids, proteins.

The course is to be treated in an elementary manner.

### *Practical Course*

Preparation of crystals and determination of water of crystallisation.

Separation of chemical and mechanical ingredients of a mixture, *e.g.*, sand and salt.

Preparation and properties of hydrogen, oxygen, chlorine and ammonia.

Detection of chloride, bromide, iodide, sulphate, sulphide, nitrate, carbonate and phosphate: of calcium, potassium, sodium, aluminium, magnesium, copper, lead, zinc, ammonium, mercury.

Acidimetry and alkalimetry.

## BOTANY AND ZOOLOGY

### *Theoretical Course*

#### *Botany*

Introduction—Phenomenon of life. The plant cell, protoplasm, nucleus, cell-contents, chloroplasts, cell divisions and

the formation of tissues. Difference between plant and animal—lowest form of plant and animal life. General classification of plant kingdom—Thallophyta—Bryophyta—Pteridophyta—Spermatophyta—(1) Gymnosperms, (2) Angiosperms, (3) Monocotyledons, (4) Dicotyledons.

The external morphology and the main anatomical features of monocotyledons and Dicotyledons. Roots, stems and leaves; their anatomy in relation to the functions performed by these organs. Primary and secondary growth and difference between herbaceous and arborescent plants. The structure and development of the flower and the functions of its various parts. Inflorescence, pollination, fertilization and development of the embryo, seed and fruit. Various kinds of seeds and fruits and their dispersal. The structure and germination of seeds.

The food of plants and its absorption, osmosis, root-pressure, ascent of sap, transpiration, photosynthesis, storage of food materials, respiration.

Growth—conditions of growth, growing regions in plants, response to external stimuli.

The relation of plants to different modes of life and habitats, *e.g.*, Xerophytes, water plants, climbing plants, epiphytes, parasites and saprophytes, common weeds of the cultivated soil and the causes of their prevalence.

Elementary facts of evolution.

Study of the general characteristics of the different groups of plants with special reference to agricultural crops of West Bengal: Malvaceae, Rutaceae, Cucurbitaceae, Cruciferae, Leguminosaceae, Solanaceae, Compositae, Rosaceae, Euphorbiaceae, Gramineae, Liliaceae, Scitamineae.

### *Zoology*

The distinctive properties of the living and the non-living. Distinction between plants and animals.

A general survey of the animal kingdom with special reference to agriculture.

Elements of classification and general characters of invertebrata and vertebrata.

General account of the animal cell and fundamental types of tissues.

A broad classification of the insects with the special reference to crop pest.

Study of the following types :—

Invertebrata—Amoeba, paramoecium, hydra, earth worm and cockroach.

Vertebrata—Fish, Frog, Fowl, Guinea pig and goat.

*Practical Course*

(a) *Botany*

Dissection and examination of selected types or materials for demonstration of subject matter mentioned in the syllabus. Simple experiments on growth and absorption, transpiration, photosynthesis, respiration.

Study of natural orders in the laboratory as well as in the fields as indicated in the syllabus.

(b) *Zoology*

Identification, demonstration and dissection of the external and internal morphology of the types mentioned in the theoretical course.

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

A

The physical and Economic Geography of Bengal. Utilization of natural resources. Goods produced from lands, mines, forests, rivers and seas. Conservation of resources. Prevention of wastes.

Scientific discoveries and technical inventions as agents in the creation of value. Rivers as sources of irrigation and power. Changes in agriculture. Crop-precasting.

Agricultural wealth. Food crops. Commercial crops. Statistics of acreage, yield, value, improved varieties, etc., as well as of holdings their size and ownership.

The cultivator. The labour, the trader, Bazars, Fairs, Exhibitions.

Rent, Wages, Profit.

Price, Costing, Accounting.

The economic unit in farming. Kinds of farming. Management.

Capital. Moneylenders. Banks : Co-operative Credit. State-aid.

Grading. Marketing. Transportation. Advertising.

Currency. Exchange Exports and Imports.

B

The gainfully employed in agriculture. Cottage industries. Other rural occupations.

Races. Castes. Classes. Migrations. Mixtures. Accentuation.

The cultivator's family. Food. Nutrition. Standard of Living, Income per head.

Rural houses. Roads. Diseases. Doctors. Public Health. Underemployed. Handicapped. Widows. Orphans. Children. Feeble-minded.

Educational and recreational institutions. Agricultural experiment stations. Demonstration farms. Radio.

Land Tenure. Law and the cultivator. Litigation.

Government activities in agriculture, animal husbandry, fishing, forestry, etc.

Union boards. Panchayats, District Boards, Departments of Agriculture, Land Revenue, Health and Education.

Social legislation. Social work for villages. Rural reconstruction schemes.

## CROP HUSBANDRY

### *Theoretical Course*

*Soils*—Formation, types and classification with special reference to cultivation in West Bengal. Soil improvement, irrigation, drainage, liming erosion, soil and soil moisture, conservation, mulching, principles of manuring and soil fertility; farm yard manure, artificial fertilizers and green manuring. Tillages. Weed control.

Elements of Agricultural Meteorology.

*Implements*—Indigenous and improved implements construction, adjustments, working and cost.

*Farm Crops*—Principles of rotations: cereals, pulses, oilseeds, fibre crops, garden crops, forage crops, soiling and ensilage.

*Pasture*—Temporary and permanent pastures. Seed mixture and seeding. Hay making. Improvement, manuring and management of pastures.

### *Practical Course*

Identification of the soils of West Bengal. Simple mechanical analysis of soil. Keen box experiment. Drying of soil and the effect of mulches on drying.

*Tillages*—Working with implements and hand tools.

*Irrigation*—Acquaintance with common water-lifts and pump.

*Identification of Common Crops*—Seed testing. Simple methods of vegetative propagation.

Identification and control measures of common crop pests and diseases. Harvesting, storing, grading and marketing and accounting.

*Workshop Practices*—Simple repairs and adjustments of tools and implements.

## ANIMAL HUSBANDRY AND FARM MANAGEMENT

### *Theoretical Course*

*Elementary Principles of Breeding*—System of breeding ; pedigrees and herd books.

*Farm Live Stock*—Cattle. Types of breeds ; their breeding, feeding and management. Dairy farming. Milk production.

*Sheep and Goat*—Breeds and crosses. Breeding, feeding and management.

*Poultry*—Breeds and crosses. Breeding, feeding and management.

*Fisheries*—Common fishes, identification of their fries. Rearing of fishes.

*Apiary*—Types of bees, management of hives.

*Veterinary Hygiene*—Signs of health. Common diseases, their symptoms. Preventive and control measures.

*Systems of Farming*—The stocking of arable, dairy and mixed farms. Capital and labour required. Income and Expenditure. Book-keeping.

### *Practical Course*

Identification of breeds of cattle, sheep, goat, fowls, ducks, common fishes and bees.

Preparation of rations and feeding farm animals. Milking and sanitation of farm buildings. Reading temperature and taking pulse of farm animals. Dressing of wounds. Castration.

## BENGALI AND ENGLISH COMPOSITION

(One paper, in two halves)

### *First Half—Bengali Composition*

An unseen passage to be summarised or amplified in Bengali

Translation from English into Bengali.

An essay in Bengali.

### *Second Half—English Composition*

Substance writing.

Translation from Vernacular into English.

Amplification and questions on general composition.

## AGRONOMY

*The courses shall consist of the methods and economics of cultivation of the important field crops with special reference to West Bengal conditions.*

*Theoretical Course*

*Paper I*

*Cereals*—Paddy, Wheat, Maize, Barley, Oat, Jowar.

*Pulses*—Mung, Kalai, Gram, Arhar, Musur, Kheshari and Matar.

*Paper II*

*Oil seeds*—Mustard, Linseed, Til, Groundnut.

Other food crops—Sugarcane, Potato, Onion.

Fibres—Cotton, Jute, Sunhemp.

Narcotics—Tobacco.

*Practical Course*

Cultivation of crops as indicated in the syllabus

HORTICULTURE

*Theoretical Course*

*Paper I*

*Introduction*—Horticultural crops. Fruits, vegetables, ornamental plants, spices, medicinal plants; plants yielding oils, rubber, dyes, tans and fibre and fodder; silk and lac host trees. Horticultural wealth of Bengal.

*Propagation*—Sexual and asexual—Vegetative propagation—cutting, layering, grafting, budding. Use of root promoting substances.

Nursery and its management.

*Paper II*

The different kinds of important fruits and vegetables and their cultivation with special reference to West Bengal conditions.

Lay-out of gardens and orchards.

*Fruits* :—Mango, Litchi, Guava, Limes, Lemons, Oranges, Papaya, Pine-apple, Banana, Coconut.

*Vegetables* :—Cabbage, Cauliflower, Potato, Tomato, Brinjal, Chilies, Patal, Onion, Melons, Cape-gooseberry.

Simple methods of application of fertilisers in vegetable and fruit gardens.

Elementary methods of fruit and vegetable preservation.

*Practical Course*

The scope of the practical course is indicated by the syllabus under the theoretical papers.

DAIRYING

*Theoretical Course*

*Paper I*

*Introduction*—Dairying in Ancient India—Present condition of milk supply—need for improvement.



Cows—Indigenous and foreign breeds. Signs of a good milker.

Milk and Milk products—Secretion, Composition, Milking. Handling of milk. Cream, butter, ghee, cheese, marketing of milk and milk products.

*Paper II*

*Construction and Arrangements of Cow Shed and Dairies—*Selection of site, design and arrangements.

*Care of Breeding Stock and Mating.*

*Dairy Hygiene*—Sanitary conditions. Housing of animals. Ventilation. Disposal of excreta. Food and water. Elementary anatomy and Physiology of cattle; diagnosis of common diseases, preventive and control measures; simple surgery; obstetrics; first-aid; external and internal parasites and methods of control.

*Dairy Accounts.*

*Practical Course*

Identification of different breeds of Indian cattle. Stock Judging. Care and handling of stock.

Preparation of rations and feeding.

Preparation of cows and utensils of milking. Milking. Recording. Cleaning of cattle sheds.

Cultivation of fodder crops, harvesting and conservation.

Treatment of sick animals.

POULTRY KEEPING

*Theoretical Course*

*Paper I*

Poultry—definition—poultry keeping a gainful and pleasant occupation.

Breeds—Indigenous and foreign breeds of fowls, ducks, geese and turkeys.

Systems of poultry farming.

Construction of poultry houses—run—renovation of run.

*Feeds and Feeding*—Selection of feeds. Methods of feeding. Fattening of fowls. Moulting.

*Paper II*

Judging of Birds for Utility and Show.

Reproduction—Mating—Selection and Management of Mating Stock.

Egg—Formation, Structure and Development. Development of Embryo. Unfertile eggs.

Incubation—Natural and Artificial. Management of Incubator. Selection of eggs for hatching. Egg nesting.

Artificial rearing of chicks; Brooder Management.

Feeding of Chicken.

Capon and Caponising.

Preservation of Eggs.

Principles of Poultry Breeding—breeding for egg and meat production. Laying records for individual bird and flock Eggs Register and Poultry Accounts.

Poultry diseases—Common diseases, their symptoms and treatment. Epidemics—Prevention and precaution.

*Practical Course*

Recognition of different breeds. Judging of birds. Handling incubator for artificial hatching. Natural incubation.

Feeding and rearing of stocks at their different stages. Handling of eggs, preservation of eggs.

Caponising.

Treatment of sick birds and their segregation.

## FISHERIES

*Theoretical Course*

*Paper I*

Definition and classification of fisheries—Different types of fisheries—fresh water, sea and estuary fisheries.

Sewage, irrigated fisheries. Fisheries and Public Health. Fisheries and Agriculture.

Identification of the common edible fish of Bengal.

Fish farming—Breeding of fish. Nesting habit and parental care in fish—Rearing of fish. Stocking of fish. Culture of Gold and other aquarium fish of Commercial Importance.

*Paper II*

Classes of fisheries in West Bengal.

Methods of fishing.

Fishery Management—Individual—Co-operative.

The fisherman—his Socio-economic Problems. Fisheries in relation to rural Economics with special reference to West Bengal.

Elements of fish technology—Indigenous methods—Scientific methods of preservation. Fish products.

*Practical Course*

Identification of the Common fishes—prawns and crabs of Bengal.

Identification of eggs and fry of the Common fish of Bengal. Determination of the age of fish from the study of their scales.

Dissection and study of Reproductive System. Stripping experiments. Determination of male or female from the study of external characters. Identification of enemies and parasites of fish.

Knowledge of the usual items of food of the Common fish.

Elementary practical knowledge of curing and preservation of fish.

## CHAPTER XXXVI

### BACHELOR OF SCIENCE

1. An examination for the Degree of Bachelor of Science shall be held annually in Calcutta, and such other places as shall from time to time be appointed by the Syndicate, and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any undergraduate of the University may be admitted to the examination provided he has prosecuted a regular course of study for not less than two academical years after passing the Intermediate Examination in Science, in one or more Colleges affiliated to the University in the subjects which the candidate takes up.

3. Every candidate sent up for the B.Sc. Examination by an affiliated College shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the College periodical examinations and other tests, and (d) of probability of passing the examination. Every candidate shall send in his application, with a certificate in the form prescribed by the Syndicate, to the Registrar at least six weeks before the date fixed for the commencement of the examination. If he desires to be examined for Honours in any subject he shall name the subject in his application. If a candidate offers Psychology he shall be required to give the Registrar notice of the fact twelve months before the date of the examination.

4. A fee of Rs. 45 shall be forwarded by each candidate with his application, provided that a candidate who applies for admission to the Honours Examination shall pay an additional fee of Rs. 10.

A candidate who fails to pass or to present himself for examination, shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to one or more subsequent examinations for the Degree of Bachelor of Science on payment of a like fee of Rs. 45 or 55 as the case may be on each occasion, subject to the provisions of Sections 4B and 4C :

Provided that if a candidate who has passed the B.Sc. Examination and is prosecuting his studies for a higher examination or other examination in a College affiliated to this University or in the University Post-Graduate Classes, is required by the University to appear in a special subject at the B.Sc. Examination, he shall pay a reduced fee of Rs. 23 for the Pass Course and Rs. 28 for the Honours Course, as the case may be.

4A. If a student, after completion of a regular course of study for the examination, does not register himself as a candi-

date for or present himself at the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied, or from a member of the Senate, testifying to his good character during the intervening period, and provided further that in case the student offers a Science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other affiliated College or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself :

Provided also that no student will be allowed to take up Honours Course unless he has re-attended lectures (theoretical and whenever necessary also practical) in the Honours subject in accordance with the provisions of Section 6 of Chapter XXVI of the Regulations.

If such student does not register himself as a candidate for, or appear at, any of the two examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, on payment of the prescribed fee, provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes a fresh course of study for at least one academical year immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing at the examination under the second paragraph of this section will be deemed to be non-collegiate students.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who, having been allowed to appear at the examination as a non-collegiate student on account of shortage of attendance at lectures,

does not register himself as a candidate for or present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students appearing under the first and second paragraphs above will be treated as non-collegiate students.

4B. If a student appears at the examination and fails, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied or, with the permission of the Syndicate, from the Principal of any other College affiliated to the University, that he has passed the Test examination held by such a College immediately preceding the examination to which he seeks admission and a certificate either from the Principal of such a College or from a member of the Senate testifying to his good character during the intervening period: Provided further that in case a student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate, from the Principal of the said College or of any other College or from some other authority approved by the Syndicate to the effect that he has taken course of practical training during the year immediately preceding the examination at which he presents himself: Provided also that no student who has been unsuccessful at the examination in an Honours subject will be allowed to take up Honours course unless he prosecutes a regular course of study for one academical year immediately preceding his admission to the examination in the Honours subject.

Second, third and fourth paragraphs of Section 4A above should apply to students referred to in the above paragraph.

4C. If a candidate is unsuccessful at the examination on account of failure to secure pass marks in one subject only but obtains 40 per cent. of marks in aggregate in other subjects, he may appear for re-examination in that subject alone in which he has failed, on payment of a fee of Rs. 23. at a special Supplementary examination, if held by the University, six months after the examination at which he was unsuccessful, or at the next Annual examination, but not at both:

Provided that the candidate produces, in addition to the ordinary certificate or certificates required by the Regulations, a certificate from the Principal of the College at which he last studied or from a member of the Senate, testifying to his good character during the intervening period:

Provided further that, in case a student appears for re-examination in a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other

college affiliated to the University in that subject or from some other authority approved by the Syndicate, to the effect that he has taken a course of practical training in that subject for a period of not less than three months preceding the examination at which he presents himself :

Provided also that no student, who has been unsuccessful at the examination in an Honours subject, shall be allowed to appear for re-examination in the Honours Course in that subject.

If the candidate obtains pass marks in the subject at the re-examination, he shall be declared to have passed the examination as a whole.

If such a candidate fails to pass in the subject at the re-examination or fails to appear at any of the examinations mentioned in the first paragraph and seeks admission to any subsequent annual examination of the University, he will be required to appear in all the subjects prescribed for the examination, subject to the provisions of Section 4B above.

5. The examination for the Degree of Bachelor of Science shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

6. Every candidate shall be examined in three of the following subjects selected by himself :—

- (I) Mathematics.
- (II) Physics.
- (III) Chemistry.
- (IV) Botany.
- (V) Geology.
- (VI) Zoology.
- (VII) Physiology.
- (VIII) Psychology.
- (IX) Anthropology.
- (X) Geography.
- (XI) Statistics.

7. No student shall be permitted to take up Mathematics or Geography for the B.Sc. Examination unless he has taken it up for his Intermediate Examination.

No student shall be permitted to take up Physics or Chemistry for the B.Sc. Examination unless he has taken up both Mathematics and Physics for the Intermediate Examination. No student shall be permitted to take up Psychology for the B.Sc. Examination unless he has taken up any one of the following subjects in the Intermediate Examination :—Psychology, Physiology, Biology, Physics, Mathematics or Anthropology.

No student shall be permitted to take up Botany for the B.Sc. Examination unless he has taken up Botany or Biology for the Intermediate Examination.

No student shall be permitted to take up Statistics for the B.Sc. Examination if he has not taken up Mathematics for the Intermediate Examination.

No student will be permitted to take up Physiology for the B.Sc. Examination unless he has taken up Physics, Chemistry, Biology, Physiology or Mathematics for the Intermediate Examination.

8. A candidate may take up the Pass Course in three subjects, or the Pass Course in two subjects and the Honours Course in one subject. In the Pass Course, in any subject except Mathematics, there shall be two theoretical papers and one paper in practical work. In the Honours Examination in any subject except Mathematics there shall be four theoretical and two practical papers. In Pass Mathematics, there shall be three theoretical papers. In Honours Mathematics, there shall be six theoretical papers and no practical papers; but every student who desires to be examined in Honours Mathematics must produce a certificate from the Principal of his College to the effect that he has completed in an affiliated College the corresponding practical course in Astronomy prescribed by the Regulations.

9. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed in the Pass Course, arranged in alphabetical order together with a list of those who have obtained Honours in each branch, arranged in two classes, both in order of merit. Names of candidates who pass the examination under Section 4C above shall be published separately, arranged in alphabetical order, without any class or distinction. Each successful candidate shall receive with his Degree of B.Sc. a certificate in the form entered in Appendix A.

10. The limits of the above subjects for both theoretical and practical work are defined below :

### MATHEMATICS

The papers in Mathematics shall be distributed as follows :—

#### PASS COURSE

##### *Paper I*

#### 1. *Higher Plane Trigonometry.*

Submultiple angles.

Properties of triangles.

Inverse circular functions.

Summation of finite series and infinite series ; elementary notion of the convergence of series as applied to the exponential series, the logarithmic series and the sine series.

De Moivre's theorem.

Exponential values of sine and cosine.

Expansion of sine  $\theta$  and cos  $\theta$  in powers of  $\theta$ .

## 2. *Plane Analytical Geometry.*

Co-ordinates, Cartesian and Polar.

Transformation of Co-ordinates ; changes of axes.

The straight line ; equations representing a pair of straight lines.

The circle.

The parabola.

The ellipse.

The hyperbola.

## *Paper II*

## 3. *Differential Calculus.*

Variables and constants.

Functions ; the graph of a function.

Limits ; continuity ; discontinuity ; differentiation ; infinitesimals ; differentials ; successive differentiation ; use of Taylor's and Maclaurin's theorems ; Lagrange's form of the remainder after  $n$  terms in Taylor's expansion.

Maxima and minima.

Differentiation of a function of several variables ; partial differentiation.

Simple Geometrical and Physical applications.

## 4. *Integral Calculus and Differential Equations.*

Integration, Integral considered as the limit of a sum.

Elementary integrals.

Integration by parts.

Integration with the help of partial fractions.

Integration of irrational and trigonometrical fractions.

Differential equations of the first order involving two variables.

Linear differential equations with constant coefficients.

Simple Geometrical and Physical applications.

## *Paper III*

## 5. *Hydrostatics.*

Nature and properties of fluid pressure.

Equilibrium of liquids ; determination of the pressure of a heavy liquid in equilibrium in simple cases.

Centre of pressure.



Density and specific gravity ; determination of specific gravities.

Conditions of equilibrium of a floating body and geometrical discussion of the stability.

Properties of elastic fluids and determination of pressure.

Measurement of heights by the barometer.

Descriptions of the barometer, air-pump, common and force pumps, the diving bell, the balloon, siphon and Brahmah's press as applications of hydrostatical principles.

*N.B.*—Candidates will be expected to apply Differential Calculus and Integral Calculus to the solution of simple Hydrostatic problems.

#### 6. *Astronomy.*

The subject is to be treated mathematically but without the use of spherical trigonometry.

The earth.

Astronomical Co-ordinates.

Astronomical clock, transit instrument, meridian circle and equatorial.

Atmospheric refraction.

The sun and the solar system.

Parallax.

Determination of the first point of Aries.

Precession, nutation, aberration.

The moon.

Lunar and solar eclipses.

Measurement of time.

Determination of latitude and longitude by simple methods.

The fixed stars.

### HONOURS COURSE

#### *Paper I*

#### 1. *Higher Algebra.*

Inequalities.

Convergence and divergence of series.

Binomial theorem.

Simple continued fractions.

Summation of series.

Determinants.

#### 2. *Elementary Theory of Equations.*

General properties of Equations.

Relation between roots and co-efficients of equations.

Transformation of equations.  
 Algebraic solution of cubic and biquadratic equations.  
 Limits of the roots of equations.  
 Solution of numerical equations.

*Paper II*

3. *Higher Plane Trigonometry.*

In addition to a fuller treatment of the Pass Course, the following :—

Expansion of  $\sin^n \theta$ ,  $\cos \theta$ ,  $\sin n\theta$ ,  $\cos n\theta$  ; hyperbolic functions.  
 Expansions in series.  
 Resolution of circular and hyperbolic functions into factors.

4. *Plane Analytical Geometry.*

In addition to a fuller treatment of the Pass Course, the general equation of the second degree in Cartesian Co-ordinates.

*Paper III*

5. *Elementary Solid Geometry.*

Cartesian and Polar Co-ordinates.  
 The straight line and plane.  
 The sphere.  
 The cone and cylinder.  
 The ellipsoid.  
 The hyperboloids.  
 The paraboloids.  
 Generating lines and sections of quadrics, conjugate diameters.  
 Diametral planes and the principal planes.  
 General equation of the second degree in Cartesian Co-ordinates.  
 Curvature of surfaces ; Meunier's theorem.

6. *Elementary Principles of Vectors.*

Fundamental notions.  
 Addition, subtraction and multiplication of vectors.  
 Elementary notion of quaternions.  
 Simple geometrical and physical applications.

*Paper IV*

7. *Differential Calculus.*

In addition to a fuller treatment of the Pass Course :—  
 an increased number of geometrical, physical and

analytical applications ; also a more rigorous knowledge of the fundamental notions, limits, continuity, discontinuity, differential co-efficient.

### 8. *Integral Calculus.*

In addition to a fuller treatment of the Pass Course :—

Formulæ of reduction.

Simple cases of definite integrals.

Fourier's Series.

Differential equations of the first and second orders involving two variables only.

### *Paper V*

### 9. *Statics.*

Composition and Resolution of forces.

General conditions of equilibrium of a particle under the action of co-planar forces.

Equilibrium of a particle on plane curves.

Composition and resolution of co-planar forces acting on a rigid body.

Principle of virtual work.

Simple machines.

Friction.

Centroids and centres of mass.

Simple cases of equilibrium of flexible, inextensible strings.

### 10. *Dynamics of a Particle.*

Velocity, acceleration.

Loss of motion.

Rectilinear, parabolic, circular and harmonic motion.

Plane constrained motions.

Impact.

Work and energy.

Central Orbits.

### *Paper VI*

### 11. *Hydrostatics.*

In addition to a fuller treatment of the Pass Course :—

Analytical discussion of the stability of the equilibrium of a floating body in simple cases.

### 12. *Astronomy.*

#### *Theoretical*

The subject of the Pass Course treated more fully.

*N.B.*—Candidates will be expected to possess an elementary knowledge of Spherical Trigonometry and to apply it to the discussion of simple problems in Astronomy.

*Practical*

The students should be required to make observations with a view to—

- (1) the determination of Latitude ;
- (2) the determination of Time ;
- (3) the determination of Longitude ;
- (4) the determination of Azimuth ;
- (5) the use of methods suitable at Sea ; and
- (6) the plotting of the apparent path of one planet among the stars.

## PHYSICS

## PASS COURSE

*Theoretical*

The subjects are to be treated mathematically as well as experimentally as far as the Mathematics of the Intermediate course are applicable.

In addition to a fuller treatment of the parts of the subject prescribed for the Intermediate Examination in Science the following :—

*General Ideas*1. *Wave Motions.*

Simple harmonic motion—Combination of S. H. Motions.  
Graphical composition of simple harmonic motions.

2. *Potential.*

Definition of Potential.  
Calculation of Potential in simple cases.

3. *General Properties of Matter.*

Gravitation and Gravitation constant.  
Moment of Inertia for simple cases.  
Deformation of Solids.  
Elasticity, Young's modulus, Poisson's ratio, Simple rigidity—treated experimentally.  
Friction.  
Experimental study of—  
    Surface Tension and Capillarity.  
    Viscosity.  
Diffusion and Osmosis.  
    Rotary Pumps.

4. *Units and Dimensions.*

*Heat*

Measurement of high and low temperatures.  
 Calorimetry and change of state.  
 Dulong and Petit's Law.  
 Vapour Density and Vapour Pressure.  
 Critical State, Andrew's and Amagat's experiments.  
 Conductivity of solids. Diffusivity—Measurement.  
 First laws of Thermodynamics.  
 Determination of J.  
 Conversion of heat into work.  
 Isothermal and adiabatic changes.  
 Specific heats under various conditions.  
 Heat engines.  
 Liquefaction of gases.  
 Nature of Radiation.  
 Elementary ideas on Kinetic Theory of Gases.

*Light*

Velocity of Light—Fizeau's and Foucault's methods.  
 Explanation of reflection and refraction from Huyghens' principle.  
 Caustic curves.  
 Magnification of Microscopes and Telescopes.  
 Sextant, Prism Binocular, Stereoscope and Periscope.  
 Dispersive power.  
 Achromatic combinations.  
 Direct-vision spectroscope.  
 Spectrometer.  
 Infra-red, visible and ultra-violet spectra.  
 Rainbow (primary).  
 Significance of the spectra of celestial bodies.  
 Doppler effect  
 Simple cases of Interference and Diffraction.  
 Diffraction grating.  
 Polarisation.  
 Double refraction.  
 Nicol's prism.

*Sound*

Velocity of Sound in air with Laplace's correction.  
 Doppler's principle.  
 Simple cases of interference of sound ; Beats.  
 Stationary waves. Forced and free vibrations. Resonance.  
 Diatonic scale. Temperament.  
 Quality of sound. Combinational tones.  
 Human voice.

*Electricity and Magnetism**(a) Magnetism.*

Explanation of reflection and refraction from Huyghens' magnetic field.

Magnetic potential.

Magnetic properties of iron and steel. Susceptibility and Permeability.

Hysteresis.

Paramagnetism, Ferromagnetism and Diamagnetism.

*(b) Frictional Electricity.*

Field of Force.

Gauss's Theorem.

Electrostatic energy.

Electric condensers of simple geometric form.

Specific inductive capacity and its measurement in case of solids.

Electrometers.

Electrostatic units.

*(c) Dynamical Electricity.*

Kirchoff's laws.

Mechanical interaction of currents and magnets.

Measurements of Electromotive force. Conductivity and resistance and current.

Electromagnetic units.

Effect of temperature on electric resistance.

Platinum thermometer.

Effect of light and magnetic field on resistance—Selenium cell.

Theory of secondary cells.

Joule's Law—Electrical Energy—Power, Efficiency.

Town and house supply of electrical energy—commercial meters.

Thermo-electricity including Peltier and Thomson effects.

Thermo-galvanometers and Electric Pyrometers.

Laws of electromagnetic induction : co-efficients of self and mutual induction.

Earth Inductor : Simple alternating currents and general principles of transformers.

Simple Dynamos and Motors.

Elementary knowledge of—

(1) Electric oscillations and electric waves.

(2) Measurement of charge and mass of electron.

(3) Thermionic tubes.

Production and nature of X-rays,  $\alpha$ -rays,  $\beta$ -rays and  $\gamma$ -rays,

*Practical*

- Use of the balance.
- Reading and correcting Barometer.
- Determination of Specific Gravities.
- Determination of the modulus of elasticity of a given wire by stretching.
- Determination of the intensity of gravity by the pendulum.
- Measurement of the co-efficient of linear expansion of metals.
- Measurement of the co-efficient of apparent expansion of a liquid.
- Measurement of the co-efficient of expansion of air at constant pressure.
- Measurement of the co-efficient of increase of pressure of a gas at constant volume.
- Determination of the specific heat of solids and liquids with radiation correction.
- Determination of the hygrometric state.
- Determination of the velocity of sound by resonance columns.
- Use of the Sonometer.
- Determination of focal lengths of Lenses and Mirrors.
- Verification of the formula for focal length of the combination of lenses.
- Determination of the magnifying power of the combination of lenses.
- Refractive index of a liquid by Microscope.
- Adjustment and use of Spectroscope.
- Spectrometer determination of the refractive index of the substance of the prism.
- $\mu$  by total reflection.
- Comparison of magnetic moments.
- Determination of horizontal intensity of Earth's magnetism.
- Use of Voltmeters and Ammeters. Millivoltmeters and Milliammeters.
- Constant of a Tangent Galvanometer by copper voltmeter.
- Figure of merit of a Galvanometer.
- Measurement of the resistance of wires.
- Comparison of electromotive forces.
- Measurement of Low and High Resistances.
- Measurement of Galvanometer Resistance.
- Laboratory arts such as glass blowing and soldering.

The Laboratory note-books of the candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books, which have not been signed at frequent intervals by the Professors under whom the candidates worked, will not be accepted.

## HONOURS COURSE

*Theoretical*

The subject for the Pass Course treated fully with the addition of the following, the whole being treated theoretically as well as experimentally :—

*General Properties—*

Experimental determination of Gravitational constant.  
Theory of Dimensions.  
Young's modulus due to bending. Torsional rigidity.  
Relation between elastic constants.  
Viscosity of liquid and gases—experimental determination.  
Production of High Vacuum. McLeod gauge.  
Brownian movement.

*Heat—*

Equations of states—Theory of corresponding states.  
Black body radiation—Stefan and Boltzman's Law.  
Empirical Radiation Formula.  
Radiation Pyrometry.  
First and second laws of Thermodynamics ; Carnot's cycle.  
Entropy.  
Absolute scale of temperature.  
Kinetic theory of gases and simple applications.  
Specific Heat at low temperature.

*Light—*

Modern methods of determination of velocity of light.  
Thick lens : Field of view.  
Compound eye-pieces.  
Interference—Newton's rings.  
Michelson's Interferometer.  
Simple cases of Diffraction.  
Resolving power of Prism and Grating.  
Anomalous Dispersion.  
Polarised Light and its interference—interference pattern in crystals.  
Circular and Elliptic polarisation : Rotatory polarisation.  
Faraday Effect. Kerr Effect.  
Spectrum and its teaching : Hydrogen spectrum—Balmer's series.  
Normal Zeeman Effect.

*Sound—*

Absolute determination of frequency of tuning fork.  
Stationary waves, forced oscillations.  
Energy of sound waves.  
Determination of intensity of sound.



*Electricity and Magnetism—*

- (a) Magnetic force due to a small magnet.  
 Energy of a magnetic field.  
 Magnetic shells.  
 Magnetic lines of force—Intensity of magnetisation and magnetic induction.  
 Permeability and Susceptibility.  
 Hysteresis—energy loss.
- (b) Laplace and Poisson's Equations.  
 Polarisation in Dielectrics.  
 Simple cases of electric images.  
 Theory of Quadrant Electrometer.
- (c) Theory and use of Ballistic Galvanometer.  
 Absolute measurement of resistance and current.  
 Alternating currents and Transformer.  
 Oscillatory Discharge of a Condenser—Hertz Experiment.  
 Ratio of Electrostatic to Electromagnetic Units.  
 Positive Rays : Isotopes.  
 Ionisation and Saturation current.  
 C. T. R. Wilson's Experiment.  
 Measurement of wave-lengths of X-rays.  
 Einstein's Photo-electric equation.  
 Significance of atomic number.

*Practical*

In addition to the Pass Course, the following :—

- Use of the balance with corrections for displacement of air.
- Calibration of tubes.
- Determination of Young's modulus of a given rod by bending.
- Measurements of surface tension by means of capillary tubes.
- Variation of density of water with temperature
- Expansion of water on solidification.
- Specific heat of liquids by the method of cooling.
- Determination of vapour pressure.
- Determination of vapour density.
- Clement's and Desorme's method of finding out the ratio of two specific heats.
- Conductivity of a bar by Searle's method.
- Velocity of sound in rods by Kundt's tube.
- Refractive indices of solids and liquids.
- Determination of nodal points of combination lenses.
- Mapping of Spectra.
- Diffraction through single and double slits.

Measurement of wave-lengths by gratings.

Bi-prism.

Measurement of battery resistance.

Platinum resistance thermometer.

Measurement of electrolytic resistance.

Determination of J. by Callendar and Barnes apparatus.

Determination of Thermo E. M. F. of a thermo-couple.

Greater proficiency is expected in glass-blowing than in the Pass Course.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books, which have not been signed at frequent intervals by the Professors under whom the candidates worked, will not be accepted.

## CHEMISTRY

### PASS COURSE

In addition to a fuller treatment of the subjects prescribed for the I.A. and I.Sc. course, the following :—

#### *Theoretical*

Periodic classification of elements, atomic number, isotopes, kinetic theory of gases, diffusion of gases, liquefaction of gases, laws of mass action, catalysis, osmotic pressure, the theory of solution, colloids, elements of thermo-chemistry, methods of determination of equivalent, atomic and molecular weights, basicity of acids, acidity of bases, allotropy, isomerism, polymerism, compound radicals and homology, velocity of chemical action, chemical equilibrium, theory of electrolytic dissociation.

Preparation and properties of the following elements and their chief compounds—oxygen, hydrogen, nitrogen, argon, fluorine, chlorine, bromine, iodine, sulphur, boron, carbon, silicon, phosphorus, arsenic, lithium, sodium, potassium, ammonium, calcium, strontium, barium, magnesium, zinc, cadmium, mercury, copper, silver, gold, aluminium, manganese, iron, tin, lead, antimony, bismuth, nickel, cobalt, chromium and the following compounds of carbon :—

Methane, ethane, ethylene, acetylene, their simple derivatives—namely, haloid derivatives, aldehydes, ketones, alcohols, monobasic acids, acid chlorides, acid anhydrides, acid amides, nitrites, ethers, esters, primary, secondary and tertiary amines, glycol, lactic acid, oxalic acid, malonic acid and succinic acid, tartaric acid, glycerol, citric acid, fats, soaps and candles (hydrolysis, saponification), dextrose, laevulose, cane sugar, starch,

cellulose ; cyanogen, hydrocyanic acid, ferro- and ferricyanides ; coal tar—and its distillation ; benzene, toluene, xylene,—orientation ; mono-chlorobenzene, mono-nitrobenzene, benzene, sulphonic acid and phenol, aniline,—diazotisation ; benzyl chloride, benzal chloride, benzotrichloride, benzyl alcohol, benzaldehyde, benzoic acid, benzoyl chloride and salicylic acid.

### *Practical*

Preparation of salts in the pure state. Qualitative analysis of inorganic mixtures containing not more than *two* radicals from the following list—silver, lead, mercury, copper, bismuth, cadmium, tin, arsenic, antimony, iron, manganese, aluminium, chromium, zinc, cobalt, nickel, calcium, strontium, barium, magnesium, potassium, sodium, ammonium, and their oxides, hydroxides, chlorides, bromides, iodides, sulphides, sulphites, sulphates, chromates, carbonates, phosphates, nitrates, nitrites, borates, silicates, cyanides and thiocyanates. Alkalimetry, acidimetry, oxidation and reduction methods of volumetric analysis, gravimetric estimation of copper, silver, iron and sulphuric acid, determination of chemical equivalent. Identification of the following organic compounds given *singly*—

Methyl alcohol, ethyl alcohol, acetone, chloroform, formic, acetic, oxalic and tartaric acids, glycerol, citric acid, urea, dextrose, cane sugar, starch, benzene, benzoic acid, aniline, phenol, salicylic acid.

### HONOURS COURSE

In addition to a fuller treatment of subjects for the Pass Course, the following :—

#### PHYSICAL AND INORGANIC CHEMISTRY

##### *Theoretical*

Avogadro's number, Maxwell's law of distribution of velocities (excluding derivation), viscosity of gases and liquids, surface tension of liquids, elementary treatment of the two laws of thermodynamics and an outline of their application to solutions, chemical equilibrium and heat changes accompanying changes in states of aggregation and chemical reactions and to the e.m.f. of cells, the phase rule and its application to two component systems, the order of reactions (homogeneous and heterogeneous reactions), equilibrium in electrolytic solutions, elementary theory of indicators, double and complex salts, the hydrogen platinum and calomel electrodes, theory of the Weston cell and of the lead accumulator, elementary ideas of the structure of

atoms, elements of crystal structure, radio-active radiations and disintegration of radium, the simpler uses of the spectroscopic methods in chemistry.

Study of the following elements and their principal compounds:—Selenium, tellurium, lithium, caesium, rubidium, platinum, uranium, helium, neon and radium.

## ORGANIC CHEMISTRY

### *Theoretical*

Isonitrites, unsaturated hydrocarbons, *viz.*, propylene, butylene, isoprene, butadiene, unsaturated alcohols, *viz.*, allyl alcohol, geraniol; unsaturated aldehydes and ketones, *viz.*, acrolein, crotonaldehyde, mesityl oxide, phorone, unsaturated acids, *viz.*, acrylic acid, crotonic acid, dimethyl acrylic acid. Typical examples of halogen derivatives of acids, hydroxy, amino and ketonic acids; glutaric, adipic and pimelic acids, Bacyer's strain hypothesis, simple monocyclic compounds; uses of organo-metallic compounds of zinc and magnesium; more important synthetic uses of malonic, cyanacetic and acetoacetic esters. Maleic and fumaric acids; glycine; derivatives of carbonic acid.

Elementary treatment of monosaccharoses with special reference to glucose and fructose; of disaccharoses, namely cane-sugar, maltose and lactose. Simple exposition of the recent ideas of carbohydrate constitution.

Uric acid and caffeine (omitting synthetic details). Simpler derivatives of benzene, *viz.*, haloid, nitro, amino, hydroxy derivatives and sulphonic acids. Simpler azo-compounds; cresols, quinone, phthalic acid, cinnamic acids, stoluic acids, salicylic aldehyde: benzal-acetone, naphthalene, anthracene and their simpler derivatives.

Indigo, methyl orange, alizarine, congo red, phenolphthalein, fluorescein, malachite green and rosaniline (Preparation and uses only).

Pyrrole and pyridene, properties and tests of quinine and brucine.

## PHYSICAL CHEMISTRY

### *Practical*

Density and surface tension of liquids by drop method, solubilities of salts, vapour density by Victor Meyer's method, velocity of hydrolysis, Identification of the most important lines of helium, hydrogen, lithium, sodium, potassium, calcium, barium and mercury in a spectroscope with attached wave-length scale.

## INORGANIC CHEMISTRY

*Practical*

The mixtures for qualitative analysis may include not more than four radicals, positive or negative, selected from the list given under the Pass syllabus with the following additions :—Hypochlorite, hypophosphite.

A more complete knowledge of volumetric and gravimetric analysis including separation of copper and iron, copper and zinc, iron and manganese, iron and zinc, analysis of brass, pyrolusite and haematite.

## ORGANIC CHEMISTRY

*Practical*

Detection of carbon, nitrogen, sulphur, halogens and phosphorous in organic compounds. Preparation of (1) ethyl bromide, (2) iodoform, (3) oxalic acid, (4) *p.* & *o.*-nitraniline, (5) acetanilide, (6) methyl orange, (7) anhydride of succinic or phthalic acid, (8) esterification and (9) anthraquinone.

Qualitative analysis of a mixture of two organic compounds which include the following in addition to the Pass list :—succinic acid, benzaldehyde, lactose, dimethyl-aniline.

The Laboratory note-books of candidates shall be records of the work done. Note-books which have not been certified to be actual records of work done in the laboratory and written in the class room, by the teacher under whom the candidates worked, will not be accepted.

## BOTANY

## PASS COURSE

There shall be two papers each of three hours' duration and carrying one hundred marks each. There shall be a practical examination of five hours' duration carrying one hundred marks.

The papers shall be distributed as follows :—

*Paper I*

Morphology, Histology, Gymnosperms and Angiosperms.

*Paper II*

Cryptogams, Physiology, Ecology, Elementary facts of evolution and heredity.

*Paper III**Practical*

Each paper shall include six questions with alternatives of each, distributed over the whole of the subject included in it.

The practical examination shall include—

- (i) Morphology (making of sections and description accompanied by labelled sketches).
- (ii) Description and identification of Phanerogamic specimens.
- (iii) Identification of specimens or preparations (chiefly from Cryptogams).
- (iv) Physiology, explanation of the use of apparatus or setting up of simple experiments.
- (v) Laboratory note-books and records of field work.

*Theoretical*

The course shall include the following :—

I. Morphology : A general study of the structure and life-history of representative types belonging to the main divisions of the plant kingdom.

II. Histology : A detailed knowledge of the structure of the cell and cell-contents, cell-division, cell-fusion, primary and secondary tissues. A general knowledge of the histology of the principal vegetative and reproductive organs from the ecological and developmental point of view.

III. Vegetable Physiology : A general knowledge of the physiology of nutrition, growth and movements. Special attention will be paid to the following :—

Osmotic properties of the cell ; absorption of water ; movement of water and gases within the plant ; chemistry of the plant-body ; food materials of plants ; their sources and form ; assimilation of Carbon and Nitrogen by autotrophic and heterotrophic plants ; special modes of nutrition ; reserve materials ; digestion ; respiration ; fermentation ; growth and factors influencing it ; movement of protoplasm ; action of gravity ; heat and light ; mechanical movements (hygroscopic movements ; dehiscence of fruits ; mechanical ejection of seeds) ; autonomous and induced movements ; the important tropisms ; nasties ; taxies ; asexual and sexual propagation of plants.

IV. The Classification of plants : Elementary knowledge of the principles of classification ; outlines of main systems of classification ; artificial, natural and phylogenetic systems. A

general knowledge of the life-history and relationships of the following groups of plants :—

1. Schizomycetes—A general account of the group.
2. Schizophyceae—Oscillatoria, Nostoc, Gleocapsa.
3. Bacillariophyta—A general account.
4. Conjugatae—Cosmarium, Zygnoma, Spirogyra.
5. Chlorophyceae—Volvox, Protococcus, Ulothrix, Oedogonium, Caulerpa, Vaucheria.
6. Charophyta—Chara.
7. Phaeophyceae—Ectocarpus, Fucus.
8. Rhodophyceae—Batrachospermum, Polysiphonia.
9. Eumycetes—Phytophthora, Peziza, Mucor, Aspergillus, Ustilago, Puccinia, Agaricus.
10. Lichens—A general account of the group.
11. Archegoniatae—
  - (i) Bryophyta ; Marchantia, Anthoceros, Riccia, Polytrichum.
  - (ii) Pteridophyta ; Polypodium, Marsilia, Equisetum, Lycopodium, Selaginella, Isoetes.
12. Spermatophyta—
  - (i) Gymnospermae ; Cycas, Pinus, Gnetum.
  - (ii) Angiosperms.
    - (a) Monocotyledons ; Gramineae, Cyperaceae, Palmaceae, Aroideae, Commelinaceae, Liliaceae, Amaryllidaceae, Scitamineae, Orchidaceae.
    - (b) Dicotyledons ; Urticaceae, Moraceae, Polygonaceae, Amarantaceae, Nyctaginaceae, Nymphaeaceae, Ranunculaceae, Magnoliaceae, Anonaceae, Cappariaceae, Cruciferae, Leguminosae, Rutaceae, Euphorbiaceae, Anacardiaceae, Sapindaceae, Vitaceae, Tiliaceae, Malvaceae, Sterculiaceae, Myrtaceae, Umbelliferae, Apocynaceae, Asclepiadaceae, Convolvulaceae, Boraginaceae, Verbenaceae, Labiatae, Solanaceae, Scrophulariaceae, Acanthaceae, Rubiaceae, Cucurbitaceae, Compositae.

Special attention shall be paid to the plants of economic and medicinal importance belonging to the above families.

V Ecology : General principles of the Ecology of plants.

VI. An elementary knowledge of the theories of evolution and heredity.

### *Practical*

1. The making, staining and description of microscopical preparations of plants.

2. Referring plants to their Families and identification by means of analytical tables up to Genera.

3. Drawing of dissections of flowers and their parts and of microscopical preparations.

4. Physiological experiments :

Osmotic properties ; Water-culture experiments ; Transpiration and root pressure experiments ; Experiments on chlorophyll ; Experiments on the relation between starch formation and external conditions. Simple experiments on respiration and fermentation. Movements of growth. Germination experiments.

5. Excursions shall be made for the systematic and oecological study of plants in nature and a record of the observations made in the field maintained.

6. The Laboratory note-books and records of field work of candidates shall be inspected and marked by examiners and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

#### HONOURS COURSE

There shall be four papers, each of three hours' duration and carrying 100 marks each. In addition there shall be two practical examinations, each of six hours' duration and carrying 100 marks each.

The papers shall be distributed as follows :—

##### *Theoretical*

*Paper I*—Algae, Fungi, Bryophyta.

*Paper II*—Pteridophyta and Gymnosperms, including fossil types.

*Paper III*—Angiosperms, Economic Botany, Plant-geography, Evolution and Genetics.

*Paper IV*—Physiology and Ecology.

##### *Practical*

*Paper V*—Morphology (Cryptogams and Phanerogams) and Systematic Botany.

*Paper VI*—Physiology and Microtechnique.

##### *Theoretical*

I. *Morphology* : A general study of the structure and life-history of representative types belonging to the main divisions of the plant kingdom as is necessary to elucidate the relation-



ships of plants. Morphology shall be studied from the comparative as well as the organographic points of view.

II. *Histology*: A detailed knowledge of the structure of the cell, cell-contents, cell-division, cell-fusion, primary and secondary tissues. A general knowledge of the histology of the principal vegetative and reproductive organs from the physiological, ecological and embryological points of view.

III. *Vegetable Physiology*: A general knowledge of the physiology of nutrition, growth, movements and reproduction of plants. Special attention will be paid to the following:—

Osmotic properties of the cell; absorption of water; transpiration, the ascent of sap; constituents of the ash of plants; carbon-assimilation in autotrophic plants; nitrogen assimilation in autotrophic plants; utilisation and transport of assimilatory products; metabolism of heterotrophic plants; respiration; fermentation; oxidation of inorganic substances; assimilation of carbon in the absence of light and chlorophyll; fixation of nitrogen; symbiosis; the energy relations of the plant; the growth of the cell; growth of the plant as a whole; influence of external factors on growth and form; inner factors controlling growth and form; growth-hormones; the development of the plant under the influence of the internal and external factors; movements of plants; hygroscopic movements; explosive mechanism; tropism; nasties; autonomous movements; locomotory movements; taxis.

IV. *Ecology and Plant-Sociology*: A general knowledge of the mutual relations of plants and their surroundings; the various plant communities including their origin, development and successions.

V. *The Classification of Plants*: (1) Principles of classification; outlines of the main systems of classification; artificial, natural and phylogenetic systems; trend of modern systematic Botany; (2) a general knowledge and phylogenetic relationships of the groups of plants mentioned below:—

1. Schizomycetes—A general account of the group.
2. Schizophyceae—Oscillatoria, Nostoc, Anabaena, Gloeocapsa.
3. Myxomycetes—A general account of the group.
4. Bacillariophyta—A general account of the group.
5. Conjugatae—Cosmarium, Zygnema, Spirogyra.
6. Chlorophyceae—Chlamydomonas, Volvox, Protococcus, Botrydium, Hydrodictyon, Ulothrix, Chaetophora, Trentepohlia, Coleochaete, Oedogonium, Caulerpa, Vaucheria.
7. Charophyta—Chara, Nitella.

8. Phaeophyceae—Ectocarpus, Laminaria, Fucus, Dictyota.
9. Rhodophyceae—Batrachospermum, Compsopogon, Ceramium, Polysiphonia.
10. Phycomycetes—Saprolegnia, Phytophthora, Pythium, Mucor, Philobolus.
11. Ascomycetes—Aspergillus, Peuicillium, Peziza, Claviceps, Saccharomyces.
12. Basidiomycetes—Ustilago, Tilletia, Puccinia, Agaricus, Polyporus, Phallus.
13. Lichens—A general account of the group.
14. Archegoniatae—
  - (i) Marchantia, Riccia, Anthoceros, Sphagnum, Polytrichum, Barbula, Lejeunia.
  - (ii) Ophioglossum, Polypodium, Marsilia, Salvinia, Azolla, Equisetum, Lycopodium, Selaginella, Psilotum, Isoetes.

A general account of Psilophytales, Sphenophyllales Calamities.
15. Spermatophyta—
  - (i) Gymnospermae : Cycas, Ginkgo, Pinus, Ephedra, Gnctum.

General account of Cycadofilicales, Cordaitales and Bennettitales.

  - (ii) Angiosperms.
    - (a) Monocotyledons : Alismataceae, Gramineae, Cyperaceae, Palmaceae, Aroideae, Commelinaceae, Liliaceae, Amaryllidaceae, Scitamineae, Orchidaceae.
    - (b) Dicotyledons : Urticaceae, Moraceae, Polygonaceae, Amarantaceae, Nyctaginaceae, Portulacaceae, Nymphaeaceae, Ranunculaceae, Magnoliaceae, Anonaceae, Papaveraceae, Capparidaceae, Cruciferae, Rosaceae, Leguminosae, Rutaceae, Euphorbiaceae, Anacardiaceae, Sapindaceae, Vitaceae, Tiliaceae, Malvaceae, Sterculiaceae, Dipterocarpaceae, Passifloraceae, Myrtaceae, Melastomaceae, Umbelliferae, Oleaceae, Gentianaceae, Apocynaceae, Asclepiadaceae, Convolvulaceae, Boraginaceae, Verbenaceae, Labiatae, Solanaceae, Scrophulariaceae, Acanthaceae, Rubiaceae, Cucurbitaceae, Compositae.

Special attention shall be paid to plants of economic or medicinal importance belonging to the above families.

VI. *Plant Geography*: The main factors affecting the distribution of plants, internal and external ; means of plant dis-

persal. The general principles of the distribution of plants on earth and a special study of the plant-geographic divisions of India.

VII. A general knowledge of the theories of Evolution and Heredity. Principles of Genetics, Mendelism. Application of Mendelian principles to Plant-breeding. Production of new and improved varieties of agricultural crops.

### *Practical*

I. Submission of practical and field note-books duly certified by the teachers from time to time.

II. Candidates will be expected to (a) dissect and describe fresh and dried specimens of plants in simple technical language and identify them with the help of a flora, (b) to prepare, stain and make permanent mounts of microscopic preparations and to be familiar with general histological methods including the use of the micritome, camera lucida and ocular micrometer, (c) to perform micro-chemical tests and (d) to perform simple physiological experiments and to explain the use of physiological apparatus.

III. Collection and preservation of specimens from botanical excursions.

The Laboratory and field note-books of candidates shall be inspected and marked by examiners and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

## GEOLOGY

### PASS COURSE

Besides a fuller treatment of the subjects prescribed for the Intermediate Examination in Science a knowledge of the following subjects shall be required :—

### *Theoretical*

Origin of land forms. Origin of mountains.

General mathematical relations of crystals. The relation of physical properties to geometrical forms of crystals. General principles of optical crystallography.

Nicol's prism. Essential parts of a polarising microscope and their uses. Methods of studying minerals in thin sections under the microscope.

Method of calculating the formula of a mineral from its analysis. Isomorphism. Classification of minerals. Description of the following minerals :—

Silver, copper, arsenic, antimony, bismuth, mercury, platinum, realgar, orpiment, stibnite, bismuthinite, molybdenite, argentite, chalcocite, millerite, niccolite, pyrrhotite, brünite, cobaltite, marcasite, arsenopyrite, bournonite, pyrrargyrite, proustite, tetrahedrite, sylvite, cryolite, carnallite, tridymite, opal, cuprite, periclase, zincite, ilmenite, spinel group, chrysoberyl, cassiterite, rutile, octahedrite, brookite, diaspore, limonite, brucite, gothite, calcite group, aragonite group, malachite, azurite, leucite, the pyroxenes, the amphiboles, beryl, cordierite, nepheline, cancrinite, sodalite group, garnet group, olivine group, topaz, scapolite group, vesuvianite, zircon, andalusite, sillimanite, staurolite, cyanite, epidote group, axinite, prehnite, zeolite group, mica group, chloritoids, chlorites, serpentine, chrysocolla, sphene, columbite, tantalite, samarskite, monazite, apatite group, turquoise, soda nitre, borax, pitchblende, barite group, crocoite, epsomite, the alums, wolframite, scheelite and wulfenite.

Optical characters of the more important rock-forming minerals. Macroscopic and microscopic description of the leading varieties of rocks and their modes of occurrence. A general knowledge of the mode of consolidation of magma, petrographic province and magmatic differentiation.

A general knowledge of metamorphism of rocks of different kinds.

Definition of an ore. Distribution in India and mode of occurrence of the following :—Gold, manganese, copper and iron ores ; mica, coal and mineral oil. A general knowledge of the uses, if any, of the minerals and rocks prescribed in this syllabus.

Morphological characters of the following classes of fossils including their classification and distribution in geological time :—

Protozoa, corals, echinoids, crinoids, brachiopoda, lamellibranchiata, gastropoda, cephalopoda, trilobites and graptolites.

A general idea of the organic evolution as indicated by fossils.

Measurement of geological time. The principles of correlation. Description of the leading lithological characters and distinctive fossils of the stratigraphical units of India.

### *Practical*

Recognition of the specimens of minerals mentioned in the syllabus by their physical and chemical tests. Drawing and description of crystals. Use of contact goniometer. Recognition

of the leading varieties of rocks and important rock-forming minerals by their macroscopic and microscopic characters.

Recognition of the following genera of fossils:—

Lepidodendron, Sigillaria, Sphenophyllum, Schizoneura, Calamites, Psymnophyllum, Pecopteris, Noeggerathiopsis, Cyca-dites, Nilssonina, Otozamites, Pterophyllum, Brachyphyllum.

Orbitolites, Alveolina, Nodosaria, Textularia, Globigerina, Orbitoides, Fusulina, Schwagerina.

Omphyma, Cyathophyllum, Montlivaltia, Isastrea, Cyclo-lites, Thamnastrea, Trochosmilina, Favosites, Syringopora, Haly-sites.

Stoliczkaria, Didymograptus, Monograptus.

Cupressocrinus, Cyathocrinus, Marsupites, Encrinurus, Pentacrinus.

Echinospheerites.

Pentamerites.

Clypeaster, Echinolampas, Hemiaster, Schizaster.

Fenestella, Protoretopora.

Lingulella, Neobolus, Lingula, Crania, Enteleutes, Rafines-quina, Leptaena, Strophomena. Streptorhynchus, Chonetes, Lyttonia, Camarophoria, Rhynchonella, Atrypa, Syringothyris, Spiriferina, Spirigera, Spirigera.

Stringocephalus, Dielasma, Terebratulina.

Palaeonchilus, Nucula, Leda, Unio, Myophoria, Trigonia, Astarte, Crassatella, Lucina, Cardium, Protocardium, Cyrena, Venus, Cytherea, Tellina, Pholadomya, Corbula, Avicula, Pseudomonotis, Monotis, Halobia, Aviculopecten, Pinna, Gervillia, Perna, Inoceramus, Lima, Pecten, Plicatula, Spondylus, Gryphaea, Exogyra, Mytilus, Modiola.

Dentalium, Pleurotomaria, Euomphalus, Turbo, Trochus, Nerita, Natica, Scalaria, Melania, Cerithium, Rostellaria, Cypraea, Ovula, Murex, Fusus, Voluta, Pleurotoma, Conus, Avellana, Limnæa, Bullinus, Planorbis.

Hyolithes, Tentaculites, Conularia, Clymenia, Goniatites, Hedenstroemia, Ophiceras, Meekoceras, Aspidites, Xenodiscus, Flemingites, Octoceras, Ptychites, Proptychites, Tropites, Halorites, Arcetes, Phylloceras, Lytoceras, Hamites, Turrilites, Baculites, Harpoceras, Stephanoceras, Macrocephalites, Perisphinctes, Hoplites, Acanthoceras, Scaphites, Indoseras.

Olenellus, Olenus, Ptychoparia, Illaenus, Phacops.

Estheria, Cypris.

Description from personal observation of the geological features of an area. Solution of simpler problems on dip, strike and outcrop.

The Laboratory and field note-books of candidates shall be inspected and marked by examiners, and if they are found to

be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

### HONOURS COURSE

In addition to a more complete and detailed knowledge of the subjects prescribed for the Pass Course candidates will be expected to show an acquaintance with:—

#### *Theoretical*

1. The genesis of rocks and of the structures found in them. Diagrammatic representation of igneous rock series.
2. The economic aspects of rock and mineral deposits with special reference to India; the modes of occurrence, origin and distribution in space and time of such deposits. General principles of prospecting.
3. A general knowledge of the more important vertebrate fossils. The leading Indian fossil species which may be regarded as index species.
4. The leading concepts regarding the age of the earth, isostasy and the origin of continents and seas.

#### *Practical*

1. Stereographic projection of simple crystals and calculation of their axial ratio.
2. The use of quartz wedge.
3. Geological mapping of a small area. General knowledge of prospecting and development of economic mineral deposits. Personal observation of deposits of at least three of the following:—Coal, Mica, Manganese, Iron and Copper ores.
4. Examination of polished sections of some of the common ore minerals:—Galena, chalcopyrite, chalcocite, bornite, sphalerite, pyrite, pyrrhotite, magnetite, hematite, ilmenite, rutile, psilomelane, pyrolusite, hollandite, braunite, sitaparite.
5. Separation of mineral grains; panning, heavy liquids, electromagnets.
6. Use of refractive index of liquids for mineral determination.

The Laboratory and field note-books of the candidates shall be inspected and marked by the examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

The lists of minerals and fossils in the Pass and Honours syllabus may be modified by the Syndicate on the recommendation of the Board of Studies in Geology and Mineralogy.

## ZOOLOGY

### PASS COURSE

#### *Theoretical*

1. General principles of Biology. The cell in development and inheritance. General notions of Evolution, variation and heredity. Evidences of Evolution.

2. Distinctive characters and broad outline classification of Protozoa :—types—Amœba, Polystomella, Euglena, Paramoecium, Vorticella, Monocystis.

3. Distinctive characters and broad outline classification of Porifera :—type—Sycon.

4. Distinctive characters and classification of Coelenterata :—types—Hydra, Obelia, Aurelia.

5. Distinctive characters and broad outline classification of Platyhelminthes :—types—Liver fluke (Fasciola), Taenia solium (particularly life-history).

6. Distinctive characters and broad outline classification of Nematelminthes :—type—Ascaris.

7. Distinctive characters of Annelida and broad divisions into classes :—types—Nereis, Earthworm, Leech. General outline of life-history of Polygordius. Structure of Trochophore larva.

8. Distinctive characters and broad outline classification of Echinodermata :—type—Starfish.

9. General characters of Arthropoda and distinctive characters of its subdivisions :—types—Prawn, Cockroach, Scorpion.

10. Distinctive characters and broad outline classification of the Mollusca :—types—Fresh-water mussel, Applesnail (Pila and Sepia).

11. Distinctive characters of the Chordate groups and their leading subdivisions :—Hemichorda, Urochorda, Euchorda and Vertebrata Classes. Structure and an outline of the life-history of the following types :—

- (1) Amphioxus.
- (2) A common Teleost.
- (3) Dog-fish.
- (4) Rana or Bufo.
- (5) Calotes.
- (6) Pigeon.
- (7) Guinea-pig or Rabbit.

12. Detailed study of (a) Skull of Dog, (b) Limbs of Horse.
13. An outline of development of Frog, Chick and Rabbit.

*Practical*

1. Microscopical examination of types mentioned in Protozoa and Coelenterata and examination of tissues and organs of Earthworm, Leech, Frog and Rabbit.
2. Dissection of Earthworm, Prawn, Cockroach, Fresh-water mussel, Teleost, Toad, Pigeon, Guinea-pig.
3. Microscopic examination, wherever possible, of all the types studied.

Distribution of Theoretical papers will be as follows :—

<i>First Paper</i>	.. Invertebrata.
<i>Second Paper</i>	.. General and Chordata.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the teacher under whom the candidates worked, will not be accepted.

HONOURS COURSE

*Theoretical*

A more detailed classification of the groups mentioned in the Pass Course.

In addition to the Pass Course, the following types in the theoretical course :—

1. Life-history of Malarial Parasite.
2. Canal system of Sponges.
3. Sea-anemone and distinctive features of Ctenophora.
4. Planaria.
5. An Echinoid and a Holothurian.
6. (a) General characters of Entomostraca. Life-history of Sacculina.  
(b) Scolopendra, Limulus.  
(c) Peripatus.
7. Life-history of Mosquito Balanoglossus, Ciona, Cyclostomata.
8. General characters of Dipnoi
9. Anatomical peculiarities of Snakes.
10. Orders of Mammals and their distinctive features.



*Practical*

The following in addition to the Pass Course :—

1. Leech, Scorpion, Pond Snail, Scoliodon, Calotes.
2. Staining and mounting in bulk microscopical objects.

Distribution of Theoretical papers will be as follows :—

<i>First Paper</i>	.. Invertebrata.
<i>Second Paper</i>	.. Chordata.
<i>Third Paper</i>	.. General and Embryology.
<i>Fourth Paper</i>	.. Essay.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the teacher under whom the candidates worked, will not be accepted.

## PHYSIOLOGY

## DISTRIBUTION OF PAPERS

*(Pass)*

Theoretical Paper I—Blood and its circulation, Respiration, Kidney, Skin and Regulation of Temperature, Reproduction, and Sense Organs.

Theoretical Paper II—Endocrine Organs, Nervous System, Nerve-Muscle Physiology, Biochemistry, Alimentation and Metabolism.

Practical Paper—Histology, Experimental Physiology, and Biochemistry.

*(Honours)*

Theoretical Paper I—Blood and its Circulation, Respiration, Lymph and Tissue Fluid.

Theoretical Paper II—Biochemistry, Alimentation and Metabolism, Nutrition and Dietetics.

Theoretical Paper III—Endocrine Organs, Kidney, Skin and Regulation of Temperature and Reproduction.

Theoretical Paper IV—Nervous System, Sense Organs and Nerve-Muscle Physiology.

Practical Paper V—Histology, Biochemistry and Experimental Physiology (Biophysics).

Practical Paper VI—Histology, Biochemistry and Experimental Physiology (Biophysics).

## DETAILED SYLLABUS

## PASS COURSE

*Theoretical***1. Introduction.**

The Cell and its differentiation.  
Characteristics of Living Matter.  
Nitrogen and Carbon cycle.

**2. Biochemical Basis of Life.**

Chemistry of Carbohydrates, Lipides and Proteins.  
Catalysis and Enzyme action.  
Chemistry of body fluids and excretion—Reaction of body fluids.

Elementary knowledge of diffusion, dialysis, osmosis, and properties of colloid.

**Alimentation, Metabolism, Dietetics and Nutrition.**

Exchange of matter and energy in the body.

Basal Metabolism.

Vitamins—Biological values of different proteins.

Mineral metabolism and requirements—Water balance of the body.

Normal Diet.

**The Digestive Organs and their Functions—**

Movements of the alimentary canal.

Absorption of various foodstuffs and their metabolism.

**3. The Circulatory System.****Blood—**

General composition of blood plasma and formed elements.

Origin, fate and functions of the formed elements.

Haemoglobin and its derivatives.

Coagulation of blood.

**Immunity.****The Course and Proof of Circulation.****Anatomy and Histology of the Heart—**

Properties of cardiac muscle.

Elementary knowledge of cardio-dynamic events.

Nutrition of heart and coronary circulation.

Innervation of heart and regulation of its beat.

Venous return and Diastolic pulse.

**Vascular System—**

Haemodynamics of Circulation.

Circulation through arteries, capillaries and veins—Blood pressure—Pulse—Velocity of blood flow and time of complete circulation.

Venous pulse.

Innervation of blood vessels and control of circulation.

Spleen and its Functions.

Lymph and Tissue Fluids.

#### 4. The Respiration System.

The Lungs—Mechanism of respiratory movements—Spirometry.

Chemistry of respiration.

Gases in blood and their tension.

Transport of oxygen and carbon dioxide in blood.

Mechanism of external and internal respiration.

Regulation of respiratory movements.

Abnormal respiration—Cheyne-Stokes Respiration—Apnoea—Dyspnoea—Asphyxia.

Effects of high and low atmospheric pressure on breathing—

Mountain sickness—Caisson disease.

Artificial respiration.

#### 5. The Excretory System.

Kidney—Formation and chemical composition of urine.

Mechanism of micturition.

#### 6. The Integumentary System.

Structure and function of skin—Formation of sweat.

Body temperature and its regulation.

#### 7. Physiology of Movement.

Nerve-muscle physiology—Different types of muscles in the body.

Changes on excitation and nature of the contractile process.

The Neurone.

Excitation process in a nerve and its propagation.

Changes undergone by a nerve on stimulation.

Neuro-muscular junction.

#### 8. The Nervous System.

Neurones and their connections.

Structure and functions of the Spinal Cord—Reciprocal innervation—Co-ordinated movement.

Structure and functions of the Hindbrain, Midbrain, Forebrain and Cerebrum—Cranial nerves, their origin and distribution.

Cerebral hemispheres—Anatomy, connections and histology of the Cortex—Localisation of functions of the cortex—Conditioned reflex.

Autonomic nervous system—General arrangement.

## 9. The Sense Organs.

General features of sensation—Classification of sensations—Exteroceptive, proprioceptive and enteroceptive sensations—Sensory end organs—Sensory pathways.

- (a) Vision—Anatomy of the Eye—Optical system—Errors of refraction.

Structure and functions of Iris—Mechanism of accommodation.

Structure and functions of Retina—Changes in retina when exposed to light—Visual field—Perimetry—Visual pathway.

Elementary knowledge of Colour vision.

- (b) Hearing—Anatomy of the Ear—Helmholtz's theory of hearing—Nervous pathways of hearing.

- (c) Sensations of Taste and Smell—Structure of receptor organs—The sensory pathways.

- (d) Cutaneous sensations.

## 10. Voice and Speech—Mechanism of the Larynx.

## 11. The Endocrine Organs.

Hormones—Methods of investigation of endocrine functions  
Structure and general functions of—

- (a) Thyroid.
- (b) Parathyroid.
- (c) Suprarenal.
- (d) Islets of Langerhaus.
- (e) Sex Glands.
- (f) Pituitary.

## 12. Reproduction.

*Practical**Histology*

*The Microscope*—its use and care.

Examination of fresh tissues and blood.

Film preparation of blood.

Preparation of haemin crystals.

*Histological examination by Teasing*—Preparation of nerve and muscle fibres by teasing and staining.

*Histological examination by Spreading*—Silver nitrate preparation of cornea, mesentery, bladder.

*Staining and mounting of Sections and their examination*—Cartilage, bone, muscle, trachea, lungs, oesophagus, stomach, intestine, salivary glands, pancreas, liver, kidney, spinal cord, cerebrum, cerebellum, lymph glands, suprarenal, spleen.

*Haemocytometry and Haemoglobinometry.*

## EXPERIMENTAL PHYSIOLOGY (BIOPHYSICS)

1. Dissection of a Frog.
2. (a) Effects of make and break shocks on frog's muscle ;  
(b) Elasticity and extensibility of muscle.
3. Simple muscle curve—Effects of load and temperature on frog's muscle.
4. Summation of contractions—Tetanus.
5. Fatigue of frog's muscle.
6. Recording of frog's heart-beat—Effect of temperature on heart.
7. Spirometry.
8. Records of respiratory movements in Man.
9. Use of Sphygmomanometer.

## BIOCHEMISTRY

1. Simple chemical tests and identification of Starch, Dextrin, Glucose, Cane Sugar, Lactose, Maltose, Fructose, Protein, Gelatine, Peptone, Lactic acid, Dilute hydrochloric acid in Gastric juice, Bile salts and pigments.
2. Emulsification and saponification of Fat.
3. Separation of Albumin, Proteoses, Peptones and Globulin.
4. Action of acids and alkalis on Proteins.
5. Examination of Urine—Reaction of urine—Tests for Acetone, Albumin, Sugar, Urea, Uric acid, Bile salts and pigments, Lactic acid, Hydrochloric acid. Indican.
6. Simple experiments on Salivary, Peptic and Pancreatic digestions.
7. Qualitative chemical analysis of some simple foodstuffs—Milk, Flour, Egg, Rice, Potato, etc.
8. Quantitative estimation of Chloride, Phosphate, Dextrose and Urea in Urine.
9. Spectroscopic examination of Haemoglobin and its derivatives.

## HONOURS COURSE

*Theoretical*

In addition to a more complete and detailed study of the subjects prescribed for the Pass Course, the following :—

Reproductive Organs—Development of fertilised ovum—Germinal membranes, Hormones of the Placenta and Mammary gland.

Energy of molecules and ions in solution—Surface action—Adsorption—Colloidal state of matter—Passage of water and

solutes across membranes—Hydrogen ion concentration and its regulation—Oxidation—Reduction.

Methods of determination of basal metabolism—Factors modifying basal metabolism—Metabolism during starvation.

Carbohydrate metabolism—Maintenance of blood sugar level—Glycosuria—Hormonal control of carbohydrate metabolism—Metabolism of lipides.

Metabolism of Neucleoproteins—Creatine—Creatinine—Protein—Sulphur—Iron.

Normal requirements of various components of food.

Volume of blood in the body—Plasma proteins and their functions—Constancy of blood—Cytology of erythrocyte—Fragility of red blood cells—Blood groups—Reticulo-endothelial system—Immunity.

Regulation of coronary flow—Electrocardiogram—Heart block—Auricular flutter and Fibrillation—Output of heart—Origin and propagation of cardiac impulse—Adaptation of cardiac activity—Metabolism of cardiac muscle—Venous pulse—Circulation time in man—Intracardiac pressure—Regulation of blood pressure—Control of veins and capillaries—Topical circulation, *e.g.*, cerebral, pulmonary, hepatic and renal—Circulation in foetus. Cerebro-Spinal fluid and its circulation.

Determination of gaseous metabolism—Methods of gas analysis in blood and air—Respiratory quotient—Regulation of breathing—Blood pressure; cerebral circulation and breathing—Carriage of gases in blood—Dissociation curves of blood gases—Oxygen content and capacity—Co-efficient of oxidation—Ionic interchange between corpuscles and plasma—Tissue oxidation.

Physiology of muscular exercise.

Muscle tone and regulation of posture—Functions of cerebral cortex—Corpus striatum—Thalamus and hypothalamus—Conditioned reflexes—Distribution and function of autonomic nervous system—Chemical transmitters.

Nutrition and protection of the Eye—Subjective and contrast phenomena—Theories of colour vision—Binocular vision—Theories of hearing—Cochlear response—Aphasia—Sensation, as of taste and smell—Cutaneous and Kinesthetic sensations—Laws of sensation—Sleep and hypnosis.

### *Practical*

In addition to the Pass Course the following :—

#### EXPERIMENTAL

1. Determination of Velocity of nerve impulse in frog's nerve.
2. Recording of fatigue of frog's muscle on slow-moving drum.

3. Electrotonus.
4. Stannius' ligature and experiments on properties of heart muscle.
5. Vagus stimulation of frog's heart.
6. Genesis of tetanus.
7. Calculation of work done by a muscle.
8. Effects of ions and drugs on frog's heart-beat.
9. Pulse tracing.
10. Use of Sphygmomanometer.
11. Indefatigability of nerve.

### HISTOLOGY

1. Cutting of sections by freezing method.
2. Staining of sections by different staining methods, *e.g.*, Haemotoxylin, Eosine, Azan, etc., and making of permanent preparations.
3. Counting of blood corpuscles.
4. Determination of size of microscopic objects.

### BIOCHEMISTRY

1. Determination of H-ion concentration by calorimetric method.
2. Estimation of sugar by Polarimeter.
3. Identification of sugars by osazone crystals.
4. Quantitative estimation of (a) Ammonia, Nitrogen in Urine, (b) Sulphate, (c) Lactose in Milk, (d) Cane sugar.
5. Determination of coagulation time.
6. Determination of blood sugar.

### PSYCHOLOGY

The examination in Pass Course shall consist of the following parts :—

#### A. THEORETICAL :—

1. General Psychology—First Paper.
2. Genetic and Abnormal Psychology—Second Paper.

#### B. PRACTICAL—Third Paper.

The examination in *Honours Course* shall consist of the following parts :—

#### A. THEORETICAL :—

1. General Psychology—*First Paper*.
2. Genetic and Abnormal Psychology—*Second Paper*.

3. Social Psychology and Histology of Psychology—*Third Paper.*

4. Educational and Industrial Psychology—*Fourth Paper.*

B. PRACTICAL—*Fifth and Sixth Papers.*

## PASS COURSE

### *Paper I*

#### *Theoretical*

#### GENERAL PSYCHOLOGY

1. Introduction : Methods. Scope. Relation of Body and Mind. General idea of the Nervous System.

2. The Structural Standpoint : The conception of elements. The different elements. General idea about other standpoints.

3. Facts and Theories of different sensations. Structure and functions of sense organs. Measurement of sensations. The Weber-Fechner's Law.

4. Image, Image-types, Synaesthesia.

5. Attention : Facts and Theories.

6. Perception : Space and time perceptions, Perception of movement. Illusions. Hallucination. Meaning and theories of perception.

7. Memory and Association : Factors in Memory and conditions of Association, Forgetting, Measurement of Memory, Disorders. Theories of Memory.

8. Learning : Learning and Memory. Types of Learning. Laws of Learning.

9. Imagination : Nature. Different forms. Day-dreams. Dreams. Invention.

10. Feeling and Emotions : Experimental investigation, Facts and theories. Experimental aesthetics.

11. Action : Reaction experiments. Types of action, Fatigue. Concept of Will.

12. Thought : Analysis of the thinking processes. Belief. Experimental Studies. Language.

13. Intelligence : Nature and theories. General idea of different kinds of Tests and their uses.

14. Personality : Concept of personality. Factors, Types, Tests.



*Paper II**Theoretical*

## GENETIC AND ABNORMAL PSYCHOLOGY

*A. Genetic Psychology* .. .. 50 marks

1. Definition. Scope. Methods.
2. Heredity and environment. Evolution. Classification of Animals.
3. Tropism. Reflex action. Instinctive action. Voluntary action.
4. Characteristic behaviours of the following Invertebrates and Vertebrates : Amoeba, paramaecium, hydra, bolyox, molluscs, crabs, ants, amphioxus, fish, birds and dogs.
5. Nervous organisation and its relation to consciousness. Evidence of mind and criteria of consciousness.
6. Evolution of instinctive and intelligent behaviour.
7. The child : (a) Physical and mental development, (b) Instincts in children, (c) Development of language and social traits, (d) Adolescence.
8. Learning in child and animals.

*B. Abnormal Psychology.* .. .. 50 marks

1. Mental disorder. Different conceptions. Criteria of normality.
2. General ideas of different kinds of mental disorder.
3. Mental deficiency, Nature and grades. Signs of mental deficiency. Practical problems.
4. Hypnotism. Somnambulism. Dissociation.
5. Description of anxiety, neuroses, hysteria and epilepsy, Obsessional psycho-neuroses, dementia, praecox, paranoia.
6. Day-dreams, Dreams, Errors.
7. Mental conflict and its mechanism. Theories.
8. Principles of Mental adjustment with special reference to psycho-analysis.

*Paper III**Practical*

1. Accommodation. Far and Near points. Pupillary reflexes. Blind spot. Colour blindness.
2. Field of vision and colour zones. Perimeter.
3. Brightness. Colour contrasts. Colour mixtures.
4. Pressure—Temperature and pain spots. Paradoxical sensations of cold.
5. Tones and Noises. Resonance. Pitch. Intensity. Timbre. Beats.

6. Smell mixtures. Olfactometer.
7. Taste compensations.
8. Kinaesthetic sensations.
9. After-image, adaptation, localisation of sensations and effects of summation of stimuli.
10. Binocular rivalry, third dimension, two-point threshold. Perception of movement.
11. Illusions.
12. Feeling. Impression and expression : Pneumograph and Ergograph.
13. Attention : Range. Tachistoscope.
14. Image types.
15. Word association.
16. Memorisation. Learning and scoring methods.
17. Reaction time : Vernier. Hipp's Chronoscope (Make-Break).

*N.B.*—Students should be trained in introspection. They are required to keep records of practical work and to familiarise themselves with the apparatus used.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

## HONOURS COURSE

### *Paper I*

#### *Theoretical*

## GENERAL PSYCHOLOGY

Detailed and critical study of the topics mentioned in the Syllabus for the Pass Course (Paper I) in General Psychology.

Besides the structural standpoint, Gestalt and Behaviouristic standpoint should also be studied.

### *Paper II*

#### *Theoretical*

## GENETIC AND ABNORMAL PSYCHOLOGY

### A. *Genetic Psychology* .. .. 50 marks.

Detailed and critical study of the topics mentioned in the Syllabus for the Pass Course (Paper II) in Genetic Psychology.

**B. *Abnormal Psychology* .. .. 50 marks.**

Detailed and critical study of the topics mentioned in the Syllabus for the Pass Course (Paper II) in Abnormal Psychology.

Greater stress should be laid on theories and historical approach to topics

*Paper III*

*Theoretical*

**SOCIAL PSYCHOLOGY AND HISTORY OF PSYCHOLOGY**

**A. *Social Psychology* : .. 50 marks.**

1. Introduction. Problems, Methods.
2. The Primitive Man : His society and religion.
3. Marriage : Exogamy, endogamy. Matriarchy, patriarchy.
4. Folklore. Myth. Rumour. Public opinion.
5. Psychology of crowds and mobs. Higher social groups.

**B. *History of Psychology* .. .. 50 marks.**

Broad outlines of History of Psychology—From the beginning of the Experimental period (J. Muller) up to the present time.

Students should be specially familiar with the Psychological systems of J. Muller, Fechner, Helmholtz, Wundt, Galton, Binet, James, Titchener, Freud, Watson, Kohler.

*Paper IV*

*Theoretical*

**EDUCATIONAL AND INDUSTRIAL PSYCHOLOGY**

**A. *Educational Psychology* .. .. 40 marks.**

1. Introduction. Problems. Methods.
2. Instinct and emotions. Development and bearing on education. Motivation in learning.
3. Learning : Methods, types and characteristics. Learning curve. Transfer of training.
4. Mental work. Mental fatigue.
5. Psychological tendencies in educational movements.
6. Educational tests.
7. Education of special types ; Gifted, backward and defective children. Problem children.

**B. *Industrial Psychology* .. .. 40 marks.**

1. Introduction. Problems. Methods.
2. The work. The worker. The environment.
3. The work. The nature of work. Monotony. Variety. Rhythm.
4. Continuity and discontinuity.
5. Output : Maximum, optimum minimum. The work curve. Pause and rest. Planning of the work. Individual and chain work.
6. Movement.
7. The environment : Illumination. Noise. Smell. Posture, Temperature. Smoke. Dust. Humidity. Air movements.
8. Fatigue : Onset. Degree. Duration. Recovery. Fatigue curve. Measurement of fatigue. Endurance. Perseverance.
9. Accidents.
10. Advertisement. Salesmanship.

**C. *Quantitative methods in Educational and Industrial Psychology* .. .. 20 marks.**

1. Statistics. Formulae and their application. Graphs.
2. Tests for intelligence, personality and vocational aptitudes.
3. Methods of standardisation.

*Papers V and VI**Practical*

In addition to the Pass Course Practical the following :—

1. Statistical methods : Mean, Median, Mode, Average deviation, Standard deviation. Probable error. Correlation. Graphic representations.
2. Psycho-physical methods. Errors.
3. Sensory acuity. Threshold and differential limen.
4. Weber-Fechner's Law.
5. Fluctuation of attention.
6. Learning. Mirror drawing.
7. Mental work and fatigue.
8. Hipp's chronoscope. Choice reactions.

*N.B.*—Students should be trained in introspection. They are to keep records of practical work and to familiarise themselves with the apparatus used.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

## ANTHROPOLOGY

## PASS COURSE

The Pass Course in Anthropology shall be distributed as follows :—

*Paper I*

General outlines of Anthropology.

*Paper II*

Ethnology of India with special reference to some particular province. Chief Linguistic Families of India.

*Paper III**Practical*

## PHYSICAL ANTHROPOLOGY

## Somatometry

Candidates should be able to define the situation of and localise the somatometrical landmarks on living persons and are expected to be familiar with the abbreviations denoting them.

They should be familiar with the procedure adopted and the descriptive terms used in Anthropometry in making observations of the following external characters :—(1) Colour of Skin, (2) Colour of Eye, (3) Eyeslits, (4) Hair, (5) Moustache and Beard, (6) Eyebrows, (7) Forehead, (8) Supraorbital Ridges, (9) Nasal Depression, (10) Nasal Bridge, (11) Nasal Septum, (12) Malars, (13) Alveolar Prognathism, (14) Lips, (15) Chin, (16) Angle of Lower Jaw.

They should be familiar with the use of the following instruments used in Anthropometry :—calipers, craniometer, pelviometer, slide compasses, anthropometer, rod compasses, metric tape, Mollison's goniometer, colorimeter, and scales for weight.

Candidates must be able to take the following measurements :—

## A.—On the Head

(1) Maximum head length, (2) Maximum head breadth, (3) Least frontal breadth, (4) Bi-zygomatic breadth, (5) Bigonial breadth, (6) Nasal length, (7) Nasal breadth, (8) Auricular height, (9) Physiognomic facial length, (10) Morphological facial length, (11) Physiognomic superior facial length, (12) Morpholo-

gical superior facial length, (13) Ear length, (14) Ear breadth, (15) Horizontal circumference, (16) Profile angle, (17) Camper's facial angle.

### B.—On the Trunk and Limbs

(18) Ht. vertex, (19) Ht. tragus, (20) Ht. sternale, (21) Ht. iliospinale, (22) Ht. tibiale, (23) Ht. spherion, (24) Ht. acromian, (25) Ht. radiale, (26) Ht. stylium, (27) Ht. dactylium, (28) Sitting height vertex, (29) Sitting height ilio-cristale, (30) Arm stretch, (31) Bi-acromial diameter, (32) Girth of thorax, (33) Length of hand, (34) Breadth of hand, (35) Length of foot, (36) Breadth of foot, (37) Weight of body .. 30 marks

### Laboratory Book

Candidates shall keep a Laboratory book showing in details the somatometrical measurements of at least 10 subjects, and the different indices derived from the measurements, and shall submit it to the examiners. Credit should be given for work done in the laboratory .. 10 marks

### TECHNOLOGY

Candidates are required to observe the following general points :—(a) Materials used for construction, (b) Shape, size and weight, (c) Decorations, if any, (d) Purpose, (e) Method of using.

#### I. Implements required for procuring Food.

##### (A) Implements for the cultivation of plants.

- (1) Digging-stick.
- (2) Spade.
- (3) Pick.
- (4) Hoe.
- (5) Mattock.
- (6) Plough.
- (7) Roller.
- (8) Axe.
- (9) Harrow.
- (10) Rake.
- (11) Scythe and sickle.
- (12) Sowing instruments.
- (13) Appliances for threshing.
- (14) Appliances for cleaning grain, e.g., winnowing fans.

## (B) Hunting accessories (other than weapons) :

- (1) Traps.
- (2) Baits, decoys, lures and flares.
- (3) Nets.

## (C) Fishing appliances :

- (1) Nets, *e.g.*, hand-nets, cast-nets ; seines ; trawl-nets ; self-acting nets. Floats and weights to be studied along with these.
- (2) Traps.
  - (a) Traps manipulated by the fisherman, *e.g.*, basket-traps ; nooses ; cage-traps.
  - (b) Self-acting traps, *e.g.*, basket-traps of the lobster-pot and thorn-trap patterns ; automatic traps.
- (3) Dams and weirs (to be studied from photographs).
- (4) Lines and their tackle.
- (5) Appliances for transfixing fish, *e.g.*, spears ; harpoons ; arrows ; gaffs ; tridents ; leisters ; gigs ; rakes.

## II. Weapons of War and Chase.

## (A) Weapons of offence :

## (a) Held in the hand.

- (1) Ornaments, *e.g.*, rings and wristlets with spikes
- (2) Clubs, *e.g.*, solid clubs and maces ; composite clubs, maces and hammers.
- (3) Axes.
- (4) Spears.

## (b) Missile weapons.

- (1) Natural objects.
- (2) Worked or manufactured projectiles, *e.g.*, sling stones ; pellets, etc.
- (3) Throwing-clubs, *e.g.*, boomerangs.
- (4) Throwing-spears, *e.g.*, javelins ; harpoons darts ; arrows.

## (c) Appliances for hurling or discharging.

- (1) Flexible spear-throwers.
- (2) Rigid spear-throwers.
- (3) Blow-tubes.
- (4) Bows, *e.g.*, plain bows ; compound bows ; composite-bows ; pellet-bows ; cross-bows.

## (d) Capturing weapons.

- (1) Lasso.
- (2) Bolas

**(B) Weapons for defence :**

- (1) Armour.
- (2) Parrying weapons.
- (3) Shields.

**III. Habitations.**

*Note.*—(1) Purpose, (2) planning, (3) arrangement of parts, (4) materials, (5) mode of construction. (To be studied from photographs and actual specimens as far as possible).

- (1) Caves, trees and other natural shelters.
- (2) Structures on piles.
- (3) Portable shelters and tents.
- (4) Huts and houses on the ground.
- (5) Constructions below ground level.

**IV. Dress.** (To be mainly studied in relation to a particular geographical area or group of peoples).

*Note.*—(1) Method of wearing, (2) technique of weaving, (3) materials used, (4) socio-political and magico-religious significance, if any.

- (1) Lower garment.
- (2) Upper garment.
- (3) Ceremonial dress.
- (4) Seasonal dress.

In addition to these students should be acquainted with examples of skin and bark clothing .. 20 marks

Every student to produce a practical note-book showing records of work done on the objects mentioned above. .. 10 marks

**PREHISTORIC ARCHÆOLOGY****I. Identification of the following Paleolithic implements :—****A. Of Stone—**

- (1) Coup-de-poings.
- (2) Scrapers.
- (3) Points.
- (4) Knives.
- (5) Microliths.

**B. Of Bone—**

- (1) Harpoons.
- (2) Batons.
- (3) Needles.



## II. Identification of the following Neolithic implements :—

- (1) Celts.
- (2) Hammer stones.
- (3) Ring stones.

.. 20 marks

Candidates must submit a note-book showing record of work done on the objects mentioned in the Syllabus

.. 10 marks

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked will not be accepted.

### HONOURS COURSE

The Honours Course in Anthropology shall be distributed as follows :—

*Paper I.*—General outlines of Anthropology.

*Paper II.*—Ethnology of India with special reference to some particular province. Chief Linguistic Families of India.

*Papers III and IV.*—A general outline of the racial and cultural history of India.

*Papers V and VI.*—Practical Examination.

### *Paper V*

#### PHYSICAL ANTHROPOLOGY

A. *Anatomy and Morphology.*—Identification and sexing of human bones ; identification of anthropoid crania ; identification of casts of fossil men and apes .. 15 marks

B. *Somatometry.*—As for the Pass Course .. 30 marks

C. *Craniometry.*—Candidates shall be familiar with the landmarks established on the skull for use in craniometry and shall be familiar with the use of the following apparatus :—Calipers (various types), slide compasses (various types), gonio-meters, craniophores, horizontal needles, orbitameter and palatometer.

Candidates should be able to take the following prescribed measurements in accordance with the International Agreements of 1906 and 1912 :—(1) Maximum cranial length, (2) Glabella-inion, (3) Nasion-inion length, (4) Maximum cranial breadth, (5) Greatest occipital breadth, (6) Bi-mastoid diameter, (7) Bi-auricular breadth, (8) Greatest frontal breadth, (9) Least frontal breadth, (10) Bi-zygomatic breadth. (11) Bi-maxillary breadth,

(12) Outer bi-orbital breadth, (13) Inner bi-orbital breadth, (14) Nasion-basion line, (15) Prosthion-basion line, (16) Nasion-prosthion line, (17) Nasal length, (18) Nasal breadth, (19) Nasion-prosthion line, (20) Inter-orbital breadth, (21) Orbital breadth, (22) Orbital height, (23) Maxillo-alveolar length, (24) Maxillo-alveolar breadth, (25) Palatal length, (26) Palatal breadth, (27) Length of occipital foramen, (28) Breadth of occipital foramen, (29) Frontal chord, (30) Parietal chord, (31) Occipital chord, (32) Sagittal cranial arc, (33) Transverse cranial arc, (34) Horizontal circumference, (35) Frontal arc, (36) Parietal arc, (37) Occipital arc, (38) Basilo-bregmatic height, (39) Auriculobregmatic height, (40) Bi-condylar breadth, (41) Bi-gonial breadth, (42) Height of ramus, (43) Symphyseal height, (44) Minimum breadth of ramus, (45) Mandibular length, (46) Metopic angle, (47) Facial profile angle, (48) Nasal profile angle, (49) Alveolar profile angle, (50) Profile angle of the nasal roof, (51) Calvarial base angle, (52) Inclination angle of the occipital foramen, (53) Frontal angle of Schwalbe, (54) Bregma angle of Schwalbe, (55) Lambda angle of Schwalbe. . . 30 marks

D. *Laboratory Book*.—Candidates shall keep a Laboratory book showing (a) the somatometrical measurements of at least 10 subjects, (b) the craniometric measurements of at least 3 skulls. The various indices derived from the measurements shall be shown, and in the case of somatometric data, the averages with their standard deviations shall be calculated. . . 25 marks

### Paper VI

#### TECHNOLOGY

Sections I, II, III and IV as in Pass Course (Paper III, Technology Section).

#### V. Means of travel and transport.

##### A. Travel and transport by land.

- (1) Ferries.
- (2) Bridges (details of types to be supplied later on).
- (3) Porters.
- (4) Pack animals.
- (5) Trailers and sledges.
- (6) Wheeled vehicles.

*Note*.—(1) Shape and size, (2) Method of construction, (3) Materials used, (4) Method of propulsion, (5) Purpose.

##### B. Travel and transport by water.

- (1) Rafts and floats.
- (2) Dug-outs.

- (3) Skin-boats, boats of basketry frame.
- (4) Earthen tubs used as boats.
- (5) Built-boats.

## VI. Industries.

### A. Basketry.

*Note.*—Students should be acquainted with the technique of the following types of baskets :—

#### (a) Plaited work.

- (1) Check.
- (2) Twilled.
- (3) Wrapped.
- (4) Twined.
- (5) Hexagonal.

#### (b) Wicker-work.

- (1) Check.
- (2) Twilled.
- (3) Twined.

#### (c) Wattle-work.

#### (d) Coiled basketry.

- (1) (i) Simple oversewn coil.
- (ii) Furcate coil.
- (iii) Bee-skeep coil.
- (2) Figure of eight.
- (3) 'Lazy Squaw'.
- (4) Crossed figure of eight.
- (5) Cycloid.

#### (e) Matting.

**B. Pottery** (to be studied in relation to a particular area or group of peoples).

*Note.*—(1) Method of construction.

- (2) Decoration.
- (3) Process of firing.
- (4) Shape and size.
- (5) Purpose.

.. 30 marks

Every student to produce a Practical note-book showing records of work done on the objects mentioned above.

.. 10 marks

## PREHISTORY ARCHÆOLOGY

(In addition to the syllabus prescribed for the Pass Course).

## I. Identification of the following Paleolithic implements :—

## A. Of Flint and Stone—

- (1) Rostro-carinates.
- (2) Anvil stones.
- (3) Awl.
- (4) Disc.
- (5) Laurel-leaf points.
- (6) Willow-leaf points.
- (7) Core scrapers.
- (8) End scrapers.

## B. Of Bone—

- (1) Arrow-straighteners.
- (2) Lance points.

II. Identification of the following Neolithic tool :—  
Arrowheads.

## III. Identification of—

- A. Hand-made and Wheel-made pottery.
- B.
  - (1) Schnurkeramik.
  - (2) Bandkeramik.
- C.
  - (1) Sarcophagus urns.
  - (2) Cinerary urns.

## IV. Identification of the following Metal objects :—

## A. Of Bronze—

- (1) Celts.
- (2) Spear-heads.
- (3) Daggers.
- (4) Swords.

## B. Of Iron—

- (1) Swords.
- (2) Daggers.

.. 30 marks

Candidates must submit a note-book showing records of work done on the objects mentioned in the syllabus. 10 marks

Field report of additional questions in lieu of the same

.. 20 marks

Suitable Books, Papers and other sources of study will be recommended from time to time by the Board of Higher Studies in Anthropology with a view to indicate the scope and extent of the knowledge expected to be possessed by the candidates.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

## GEOGRAPHY

### PASS COURSE

#### *Theoretical*

#### Paper I—Regional Geography—

(a) Asia with fuller treatment of India.

(b) Europe and *one* of the following as may be prescribed from time to time by the Syndicate: Africa, North America, South America and Australasia.

Natural regions, their relationships to political territories, and their economic importance; group life in various environments; the chief racial and national characteristics; the degree of adaptability to the physical environment; the distribution and influence of various types of rocks on the topographical features in so far as they determine human activities; topographical features determined by climate, form of erosion, and tectonic movements; the river systems; climate and weather types; the influence of the neighbouring seas and oceans on the lands and their inhabitants; soils, their distribution and effects on natural vegetation and cultivated plants; general characteristics of the forests and their economic products; the distribution of animals; the distribution of minerals and the sources of mechanical power, their relationships to the industrial activities; localisation of manufacturing, mining, and other industries; important international and interprovincial trade routes; sites and functions of some important cities.

#### Paper II—Principles of Human and Physical Geography—

A thorough knowledge of the fundamental principles of Human and Physical Geography to form a basis for the study of Regional Geography.

In addition to a fuller treatment of the subjects included in the Intermediate Course the following:—

The environment as the physical basis of the life of various human groups, with special reference to India; modification of natural landscape by human agencies; the effects of the industrialisation of the world upon the distribution of population.

The earth's crust—the properties of the chief rock-forming minerals and mineral fertilizers; classification and general properties of the chief types of rocks; their modes of origin, and structures due to folding and faulting; processes of denudation

and deposition; soil formation and soil type; development of river systems; the cycle of erosion; general characters of the chief types of topography.

Wave and tidal movements and their effects; origin and effects of ocean circulations.

### *Practical*

(a) Cartographical representation of meteorological and economic data.

(b) Interpretation of weather and climatic maps.

(c) Construction of maps on some simple projections used in a standard atlas.

(d) Surveying—Simple methods of surveys including the use of plain-table and prismatic compass.

(e) Interpretation of Topographical Maps ( $\frac{1}{4}$ ",  $\frac{1}{2}$ ", 1", maps) of some natural regions of India, and simple geological maps of India showing horizontal beds and simple folds.

(f) Megascopic examination of chief rock-forming and economic minerals, and the chief types of igneous, sedimentary and metamorphic rocks.

(g) Identification of principal cereals and fibres of India.

(h) Geographical Excursions—Students must take part in geographical excursions arranged by the authorities.

### HONOURS COURSE

#### *Theoretical*

*Papers I and II*—General Regional Geography—

*Paper I*—(a) India and the Monsoon Lands of Asia.

(b) Western Asia with special reference to Anatolia.

*Paper II*—(a) Europe with fuller treatment of the British Isles.

(b) *One* of the following as may be prescribed by the Syndicate from time to time.

North America with special reference to United States.

South America with special reference to Brazil.

Africa with special reference to territories inhabited by Indian emigrants.

Australasia.

*Paper III*—Principles of Physical and Human Geography.

## Paper IV—Special Topics—

Two of the following are to be taken (other subjects may be prescribed by the Syndicate from time to time) :—

- (a) Climatology.
- (b) River Geography.
- (c) Economic Geography.
- (d) Cartography.
- (e) Political Geography.

*Papers I and II**General Regional Geography*

Natural regions, their relationships to political territories, and their economic importance; group life in various environments; the chief racial and national characteristics; the degree of adaptability to the physical environment; the distribution and influences of various types of rocks on the topographical features in so far as they determine human activities; topographical features determined by climate, form of erosion, and tectonic movements; the river systems; climate and weather types; the influence of the neighbouring seas and oceans on the lands and their inhabitants; soils, their distribution and effects on natural vegetation and cultivated plants; general characteristics of the forests, and their economic products; the distribution of animals; the distribution of minerals and the sources of mechanical power, their relationships to the industrial activities; localisation of manufacturing, mining and other industries; important international and interprovincial trade routes; sites and functions of some important cities.

India and the Monsoon Lands of Asia—India including Burma and Ceylon, Indo-China, Malay Archipelago, China and Japan to be studied. Geographical maps of the International series on the scale of 1 : 10,00,000 to be used in connection with the regional geography of India.

The Kumaon Himalāya, the Meghālaya and the Doab of the Ganges and Jumna; a detailed study of the region to be required with the help of 1" Survey maps, and Governmental and other publications. Candidates are expected to study the inter-relations and the evolution of the various physical and biological elements in the geography of the selected area.

Europe, North America or South America or Africa or Australasia. Emphasis to be made on the part played by man in the exploitation and consequent modification of lands in neighbouring areas with a view to obtaining foods, clothing, shelter and luxuries of the civilised life. Comparisons to be made with India, wherever possible.

*Paper III**Principles of Physical and Human Geography*

A thorough knowledge of the fundamental principles of Physical and Human Geography to form a basis for the study of Regional Geography.

In addition to a fuller treatment of the subjects included in the Pass Course the following :—

Distribution and differentiation of the human race : characteristics of social groups.

The geographical factors affecting the development of industries and production of raw materials and food-stuffs derived from land and water.

Evolution of chief types of land forms.

Climatic factors leading to a recognition of the chief climate and weather types.

*Paper IV**Special Topics**(a) Climatology*

Meteorological instruments, their construction and uses ; Diurnal, seasonal and annual distribution of the elements of climates, their causes and effects ; oscillations of climatic elements, leading to a recognition of weather types ; weather conditions of upper air ; periodic and aperiodic winds ; monsoon, tropical and sub-tropical cyclones, nor'westers, thunderstorms, dust storms and cyclonic storms ; conditions of local circulation ; different forms of precipitation and their causes ; climatic regions ; climate and weather types of India in detail.

*(b) River Geography*

Topography and drainage ; various types of springs, rivers and river valleys ; factors affecting the volume of water discharged by rivers ; erosion by rivers ; river deposits ; water power derived from rapids and waterfalls ; canals and tanks ; river traffic, the part played by rivers in the evolution of human societies ; glaciation in relation to river systems of India ; study of the life history of the Ganges, Indus and Brahmaputra ; changes in the courses of Indian rivers during historic times ; river problems in Bengal.

*(c) Economic Geography*

A fuller treatment of the geographical factors affecting the production of raw materials and food-stuffs derived from land and water, their home consumption and export ; manufacturing industries ; the development of power resources ; the transport



and marketing of commodities. Tea, jute and cotton to be treated in some detail as examples in agricultural, commercial and industrial geography. The economic geography of India to be treated in some detail.

#### (d) *Cartography*

The construction and uses of the following instruments of survey :—Prismatic compass ; level, sextant, and theodolite ; contours and traverse ; simple treatment of geodetic and photographic surveying ; a fuller treatment of map projections.

The study and interpretation of large scale topographical maps issued by the Survey of India. Some reference to be made to issues of British Ordnance Surveys and French Service Geographique de l'Armée.

Collection of data on climatology, economic and human geography, and their cartographical representations.

#### (e) *Political Geography*

The geographical position of the lands of the chief States, their people, frontiers and capital cities ; a fuller treatment of the geographical background of modern socio-political problems ; the development of Colonial Powers with the settlement of new lands ; types of British colonisation, and the part played by Indians in the development of the British Commonwealth.

### *Practical*

#### *Paper I—(a) Surveying.*

##### (b) Identification of rocks, minerals, plants and cereals.

Surveying—Methods of survey, including the use of the chain, plane-table and prismatic compass ; levelling ; the determination of horizontal and vertical distances with the help of the theodolite.

Rocks, Minerals, Plants and Cereals—Examination of the principal rock-forming and economic minerals, and principal sedimentary, igneous and metamorphic rocks ; identification of typical plants and cereals.

#### *Paper II—Map work.*

(a) Interpretation of topographical, climatological, and geological maps.

The interpretation of large scale maps and of topographical maps of the International series of some typical regions of the world ; also interpretation of simple geological maps. Climatic and economic maps drawn from data published in the Memoirs of the Indian Meteorological Department and other scientific departments.

(b) Map projections—Drawing of maps on simple projections.

(c) Preparation of geographical maps from original sources of the area selected in the theoretical paper [Paper I(b)].

*N.B.*—The Laboratory note-books of the candidates shall be inspected and marked by examiners. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

## STATISTICS

### PASS COURSE

The subject will be treated mathematically as far as the Mathematics of the Intermediate Course are applicable.

#### *Theoretical*

Compilation and classification of data. Graphical representation and interpretation of charts and diagrams. Smoothing of data. Trends and fluctuations. Method of moving averages. Method of least squares. Line of best fit. Graduation by a second degree parabola. Interpolation. Elements of the theory of probability. Addition and multiplication theorems.

Concepts of statistical populations and random samples. Histograms and frequency charts. Method of Moments. Mean, Median, Mode. Quartile, decile, percentile, range, quartile difference, mean difference, standard deviation. Normal, Poisson and Binomial distributions. Non-normal distributions.

General ideas of association, contingency and correlation. Contingency tables. Tests of independence. Chi-square test. Co-efficient of correlation and its significance. Regression equations. Partial and multiple correlation for three variates. The use of the probability integral. Standard and probable errors. Goodness of fit. Tests of significance. Analysis of variance.

Contents of important Indian statistical publications. Interpretation of economic and business statistics. Construction and use of Index numbers. Trade statistics. Trends, seasonal and cyclic variations. Census. Distribution of population by sex, age, occupation, etc. Intelligence and achievement tests. Application of statistics in agriculture and industry. Design of experiments. Replication. Randomization. Sampling surveys. Preparation of schedules and forms for enquiries.

#### *Practical*

Scrutiny of data and reconciliation of discrepancies. Tabulation and classification of statistical data. Graphical representation and interpretation of bar and circular diagrams, time records, histograms, frequency curves and correlation charts.

Simple interpolation. Calculation of arithmetic, geometric and weighted averages. Construction of simple Index Numbers. Simple Nomograms. Preparation of grouped frequency and correlation tables. Calculation of moments up to the fourth order with adjustments for grouping. Calculation of mean, standard deviation, co-efficient of variation and co-efficient of correlation with standard errors. Fitting of normal curve. Use of the probability integral for the normal curve. Tests of significance. Chi-square test. Simple cases of analysis of variance.

Candidates will be expected to be familiar with the use of standard mathematical and statistical tables, slide rules and simple types of calculating machines.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked will not be accepted.

### HONOURS COURSE

#### *Theoretical*

The subject for the Pass Course will be treated in greater detail with the addition of the following :—

Finite differences and interpolation. Graduation by empirical formulæ. Use of polynomial functions. Harmonic and periodogram analysis. Elements of mathematical theory of probability. Inverse probability. Frequency distributions. Principle of maximum likelihood in estimation. Bi-variate normal correlation surface. Partial and multiple correlation for four variates. Special methods for finding correlation. Non-linear regression. Contingency tables. Tests of independence and association. Elements of the theory of sampling distributions. The exact distribution of mean, standard deviation, statistic, ratio of variances, co-efficient of correlation when the population value is zero, and Chi-square statistics. Goodness of fit. Analysis of variance for factorial experiments. Applications of the statistical method in economics, commerce and industry, agriculture, psychology and education, medicine and public health, biology and other experimental sciences. Design of experiments. Representative samples. Technique of sample surveys.

#### *Practical*

In addition to the Pass Course :—

Measurement of areas by planimeter and by graphical methods. Inverse and bi-variate interpolation. Fitting of curves by least square methods. Calculation of secular trend

and seasonal and cyclic fluctuations. Harmonic analysis with 12 ordinates. Fitting of Pearson curves—Types I and III. Use of the Chi-square test. Contingency tables. Multiple regression for three variates. Significance of co-efficients of correlations. Correlation ratio. Non-linear regression. Analysis of variance and co-variance. Use of tables of test criteria. Statistical analysis of actual data.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

Students who have passed the Intermediate Examination with Mathematics, Physics and Chemistry may be examined in one of the following *Alternative Honours Courses* :—

#### COURSE A

- |                         |    |   |
|-------------------------|----|---|
| I. Pure Mathematics     | .. | Two Papers.                             |
| II. Applied Mathematics | .. | Three Papers.                           |
| III. Drawing            | .. | One Paper and a Practical Examination.  |
| IV. Physics             | .. | Two Papers and a Practical Examination. |
| V. Chemistry            | .. | One Paper and a Practical Examination.  |

*Pure Mathematics* shall include—

- (a) Higher Algebra.
- (b) Higher Plane Trigonometry.
- (c) Vector Analysis.
- (d) Analytical Geometry (Plane).
- (e) Analytical Geometry (Solid).
- (f) Differential Calculus.
- (g) Integral Calculus.
- (h) Differential Equations.

*Applied Mathematics* shall include—

- (a) Statics and Graphical Statics.
- (b) Dynamics of a Particle.
- (c) Elementary Rigid Dynamics.
- (d) Hydrostatics.
- (e) Hydraulics.
- (f) Strength of Materials.

*Drawing* shall include—

- (a) Tracing.
- (b) Descriptive Geometrical Drawing.
- (c) Drawing from Models.
- (d) Design of Machine Elements.

*Physics* shall include—

- (a) General Properties of Matter.
- (b) Heat and Technical Thermodynamics.
- (c) Electricity and Magnetism including Electro-mechanics.
- (d) Light.

*Chemistry* shall include a general knowledge of the subject with special reference to—

- (a) Technology of water—Determination of hardness and softening process.
- (b) Fuel—Determination of calorific power of different technical fuels.
- (c) Chemistry of Combustion.
- (d) Lubricating oils—Determination of viscosity, flash point and suitability for different purposes.
- (e) Chemistry of technically important metals with special stress on Iron and Steel.

#### COURSE B

- I. Pure Mathematics .. Two Papers.
- II. Applied Mathematics .. Two Papers.
- III. Drawing .. One Paper including Practical Examinations.
- IV. Physics .. Three Papers and two Practical Examinations.
- V. Chemistry .. One Paper and Practical Examinations.

*Pure Mathematics* shall include—

- (a) Analytical Geometry (Plane).
- (b) Analytical Geometry (Solid).
- (c) Vector Analysis.
- (d) Differential Calculus.
- (e) Integral Calculus.
- (f) Differential Equations.

*Applied Mathematics* shall include—

- (a) Statics and Graphical Statics.
- (b) Dynamics of a Particle.
- (c) Elementary Rigid Dynamics.
- (d) Hydrostatics.
- (e) Hydraulics.
- (f) Strength of Materials.

*Drawing* shall include—

- (a) Tracing.
- (b) Descriptive Geometrical Drawing.
- (c) Drawing from Models.
- (d) Design of Machine Elements.

*Physics* shall include—

- (a) General Properties of Matter.
- (b) Heat.
- (c) Electricity and Magnetism.
- (d) Light.
- (e) Sound.

*Chemistry* shall include—

Physical Chemistry.

Candidates will be expected to possess a knowledge of the general principles of Chemistry.

### COURSE C

- I. Pure Mathematics .. One Paper.
- II. Applied Mathematics .. One Paper.
- III. Drawing .. .. One Paper including Practical Examinations.
- IV. Physics .. .. Two Papers and a Practical Examination.
- V. Chemistry .. .. Three Papers and three Practical Examinations.

*Pure Mathematics* shall include—

- (a) Analytical Geometry (Plane).
- (b) Analytical Geometry (Solid).
- (c) Vector Analysis.
- (d) Differential Calculus.
- (e) Integral Calculus.
- (f) Differential Equations.

*Applied Mathematics* shall include—

- (a) Hydrostatics.
- (b) Hydraulics.
- (c) Strength of Materials.

*Drawing* shall include—

- (a) Tracing.
- (b) Descriptive Geometrical Drawing.
- (c) Drawing from Models.
- (d) Design of Machine Elements.

*Physics* shall include—

- (a) General Properties of Matter.
- (b) Heat including Thermodynamics of Heat Engines.
- (c) Electricity and Magnetism including elementary principles of Electrical Machines.
- (d) Light.

*Chemistry* shall include—

- (a) Physical Chemistry.
- (b) Inorganic Chemistry.
- (c) Organic Chemistry.

The limits of each subject in each course shall be defined by a detailed syllabus to be drawn up from time to time jointly by the Board of Studies and the Board of Higher Studies concerned. Special stress will be laid on the practical applications of the subjects.

100 marks shall be assigned to each written paper and to each Practical examination. In order to pass, a candidate must obtain 30 marks in each written paper, 40 marks in each practical examination, and 400 marks in the aggregate. A candidate who obtains 720 marks shall be placed in the First Class and a candidate who obtains 480 marks shall be placed in the Second Class.

Candidates shall be required to produce Laboratory note-books and other records of regular work during the entire period of study. These will not be accepted and valued unless duly attested and certified by a recognised teacher at regular intervals. Candidates may be questioned orally with regard to the contents of their note-books and other records.

## GENERAL

1. A candidate must obtain, in order to pass in the Pass Course, in—

Mathematics ..	..	100 marks.
Any other subject	..	60 marks in the Theoretical papers. 40 marks in the Practical papers.

2. A candidate must obtain, in order to pass in the Honours Course, in—

Mathematics ..	..	180 marks.
Any other subject	..	108 marks in the Theoretical papers. 72 marks in the Practical papers.

3. A candidate must obtain, in order to attain the Honours standard, in—

Mathematics ..	..	240 marks.
Any other subject	..	160 marks in the Theoretical papers. 80 marks in the Practical papers.

4. If a candidate takes up the Pass Course in three subjects, he must, in order to pass the B.Sc. Examination, pass in each subject, and obtain 324 marks in the aggregate. If he passes

and obtains 450 marks in the aggregate, he shall be declared to have passed with Distinction.

5. If a candidate takes up the Pass Course in two subjects and the Honours Course in one subject, he must, in order to pass the B.Sc. Examination, pass in each subject, and obtain 432 marks in the aggregate. If he passes and also attains the Honours standard in his Honours subject, he shall be declared to have obtained Second Class Honours in that subject. If he passes, attains the Honours standard in his Honours subject, and obtains 360 marks in that subject, he shall be declared to have obtained First Class Honours in such subject.

6. Any candidate who has failed in one subject only, by not more than 5 per cent. of the full marks in that subject, and has shown merit by gaining 50% or more in the aggregate of the marks of the examination, shall be allowed to pass. If any such candidate has taken up the Pass Course in three subjects, he shall not be declared to have passed with Distinction. But if the candidate has taken up the Pass Course in two subjects and the Honours Course in one subject, and has attained the Honours standard in such subject, he shall be allowed to retain his Honours and his place in the Honours list.

7. If the Examination Board is of opinion that, in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reason for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

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## CHAPTER XXXVI-A

### BACHELOR OF SCIENCE (TECHNOLOGY)

1. An examination for the Degree of Bachelor of Science (Technology) shall be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. The examination shall be held in any one of the following subjects or in such other subject or subjects as may be determined by the Syndicate from time to time :—

- (i) Textile Technology.
- (ii) Leather Technology.
- (iii) Jute Technology.

3. Any Under-Graduate of the University may be admitted to this examination provided he has prosecuted a regular course of study for not less than three academic years in a College or Colleges affiliated to the University to the B.Sc. (Tech.) standard after passing the Intermediate Examination in Science of this University or an examination considered by the Syndicate to be equivalent thereto, with Physics, Chemistry and Mathematics.

4. The course of studies for the examination shall be for three years and the examination shall be held in two parts—Part I Examination at the end of the second year and Part II Examination at the end of the third year.

5. There shall be five Theoretical papers and five Practical papers for each of Part I and Part II Examinations. Each Theoretical paper shall be of three hours and shall carry 100 marks. Out of 100 marks in each Practical paper 40 marks shall be set apart for sessional work of the candidate as recorded in the notes taken by the candidate at the time of working in the Laboratory or Workshop.

6. Every candidate for admission to the Part I or Part II Examination shall send in to the Registrar his application with a fee of Rs. 50, not less than two months before the date fixed for the commencement of the examination.

A candidate who fails to pass or to present himself for the examination after being registered for the same, shall not be entitled to a refund of the fee.

7. A candidate who fails to register for or to pass or present himself at the examination immediately after completion of his regular course of studies may be admitted to one or more subsequent examinations on payment of the prescribed fee on each occasion subject to the condition that he prosecutes a regular course of study in an affiliated College for at least six

months during the academic year immediately preceding the examination.

8. In order to pass Part I Examination, a candidate must secure 40 per cent. in the aggregate for the Theoretical papers and 40 per cent. in the aggregate for the Practical papers respectively and 50 per cent. of the total full marks for the Part I Examination.

As soon as possible after the Part I Examination, the Syndicate shall publish a list of successful candidates arranged alphabetically.

9. In order to pass the B.Sc. (Tech.) Examination a candidate must secure 40 per cent. in the aggregate for the Theoretical papers, 40 per cent. in the aggregate for the Practical papers and 50 per cent. of the total full marks for the Part II Examinations.

10. As soon as possible after the Part II Examination, the Syndicate shall publish a list of successful candidates arranged in order of merit on the combined results of Part I and Part II Examinations in two classes. Candidates obtaining 66 per cent. of the total full marks for the two examinations shall be placed in the First Class, and those obtaining 50 per cent. in the Second Class.

The Degree of B.Sc. (Tech.) will be awarded on the combined results of Part I and Part II Examinations but only after the candidate has satisfactorily completed six months' works training in a workshop or a factory selected by the Head of the Department or Institution concerned and has produced a certificate to that effect.

The Diploma shall state distinctly in which subject the candidate was examined and the class in which he was placed.

11. The candidate who is placed First in the First Class in each subject shall receive a Gold Medal and a Prize of books to the value of Rs. 200.

12. The course for the Part I and Part II of the Examinations shall be as follows :—

### B.Sc. (TECH.) EXAMINATION

#### *Part I*

(To be taken at the end of the Second year)

#### *Theoretical—*

Paper	I	Mathematics.
„	II	Physics.
„	III	Chemistry.
„	IV	Elements of Mechanical and Theoretical Engineering.
„	V	(a) Elements of Statistics and Economics. (b) Commercial Accounts and Costing.

*Practical—*

Paper	I	Engineering Drawing.
"	II	Physics.
"	III	Chemistry.
"	IV	Elementary Electrical Machines Practice.
"	V	Workshop Practice.

*Part II*

(To be taken at the end of the Third-year)

## 1. TEXTILE TECHNOLOGY

*Theoretical—*

Paper	I	(a) Textile Fibres and Spinning. (b) Testing of Textiles.
"	II	(a) Fibre Structure. (b) Yarn Preparation.
"	III	(a) Design and Analysis of Cloth. (b) Weaving Mechanism.
"	IV	Dyeing and Calico Printing.
"	V	(a) Industrial Administration. (b) Economics of Textile Industry.

*Practical—*

Paper	I	Testing of Textiles.
"	II	Yarn Preparation.
"	III	Design and Analysis of Cloth.
"	IV	Practical Weaving.
"	V	Dyeing and Calico Printing.

## 2. LEATHER TECHNOLOGY

*Theoretical—*

Paper	I	Chemistry and Physics of Hides and Skins.
"	II	Materials, Principles and Methods of Manufacture.
"	III	Machineries.
"	IV	Microscopy and Bacteriology.
"	V	(a) Industrial Administration. (b) Economics of Leather Industry.

*Practical—*

Paper	I	Analytical Chemistry.
"	II	Microscopy and Bacteriology.
"	III	Leather Machinery Practice.
"	IV & V	Tanning.

## 3. JUTE TECHNOLOGY

*Part II**Theoretical—*

- |       |     |   |
|-------|-----|---|
| Paper | I   | (a) Classification and properties of Vegetable Fibres.<br>(b) Production, Grading and Marketing of Jute.                        |
| „     | II  | (a) Processes preparatory to Spinning.<br>(b) The various stages of the Spinning Process.                                       |
| „     | III | (a) Processes preparatory to Weaving.<br>(b) Weaving.   |
| „     | IV  | (a) Outlines of Bleaching and Dyeing.<br>(b) Finishing and Processes preparatory to Despatch.<br>(c) Utilisation of Jute Goods. |
| „     | V   | (a) Mill Organisation.<br>(b) Testing and Cloth Analysis.   |

*Note.*—A good knowledge of the construction, mode of action and adjustment of the various machines employed and of the various calculations involved in processing, would be expected.

*Practical—*

- |       |     |  |
|-------|-----|--|
| Paper | I   | (a) Identification of Fibres.<br>(b) Textile Testing and Cloth Analysis. |
| „     | II  | Classification and Grading of Jute.                                      |
| „     | III | Practical Spinning and Weaving.  |
| „     | IV  | Cloth Design.  |
| „     | V   | Dyeing and Bleaching.  |

13. The limits of the courses shall be determined by the Syndicate on the recommendation of the Board of Studies in Technology concerned and modified from time to time if necessary.

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## CHAPTER XXXVII

### MASTER OF SCIENCE

1. An examination for the Degree of Master of Science shall be held annually in Calcutta, commencing at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

Any candidate who has passed the B.Sc. Examination not less than two academical years previously may be examined for the Degree of M.Sc. in any subject mentioned in Regulation 5, provided he has passed the B.Sc. Examination in such subject or in an allied\* subject and has prosecuted a regular course of study for two academical years in a College or Colleges affiliated to the University in respect of that subject and standard, or in the Post-Graduate classes of the University.

No candidate shall be allowed to prosecute the course of study in Education unless he has previously passed the B.T. (Bachelor of Teaching) Examination.

Any candidate who has passed the B.Sc. Examination not less than three academical years previously may be admitted as a Private student to the M.Sc. Examination in Pure Mathematics and Applied Mathematics subject to the provisions of Section 19 of the Indian Universities Act.

2. †Every candidate shall send in his application with a certificate in the form prescribed by the Syndicate and a fee of Rs. 80 to the Registrar not less than three months before the examination. If a student desires to appear in the M.Sc. Examination in Psychology, he shall give the Registrar one year's notice of the fact.

3. Any Master of Science may, on payment of a fee of eighty rupees, be admitted to the M.Sc. Examination in any subject or a group comprised in a subject, other than that in which he was previously examined, provided that if he takes up a subject other than Pure Mathematics and Applied Mathematics, he has passed the B.Sc. Examination in such subject or in an allied\* subject and has prosecuted a regular course of study in that subject for a period of two academical years in a College affiliated to the University in respect of that subject and standard, or in the Post-Graduate classes of the University.

\**N.B.*—The Executive Committee of the Council of Post-Graduate Teaching in Arts or Science, as the case may be, will decide which subject is an allied subject.

† Candidates who take up Pure Mathematics and Applied Mathematics shall send in their applications and fees to the Registrar six months before the commencement of the examination.

He shall, if his attainments come up to the standard prescribed for the Degree of M.Sc., be granted a certificate to that effect, stating the subject and class in which he has passed.

4. A candidate, who fails to pass, or to present himself for examination, shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to any one or more subsequent M.Sc. Examinations in that subject as a Private student on payment of a like fee of Eighty Rupees on each occasion subject to the provisions of Section 19 of the Indian Universities Act, provided that in case the candidate offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

4A. If a student, after completion of a regular course of study for the examination, does not register himself as a candidate for or present himself at the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required under the Regulations, a certificate from the Head of the Institution at which he studied or from a member of the Senate testifying to his good character during the intervening period, and provided further that in case the student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

Such a student may appear at any one or more subsequent M.Sc. Examinations in that subject as a Private candidate on payment of the prescribed fee subject to the provisions of Section 19 of the Indian Universities Act, provided that in case the candidate offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness

or any other reason considered sufficient by the Syndicate the above rules may be applied to the cases of such students by the Syndicate.

5. A candidate may be examined in any of the following subjects :—

- I. Pure Mathematics.
- I-A. Applied Mathematics.
- II. Chemistry.
- III. Physics.
- IV. Botany.
- V. Physiology.
- VI. Zoology and Comparative Anatomy.
- VII. Geology.
- VIII. Psychology.
- IX. Anthropology.
- X. Statistics.
- XI. Geography.
- XII. Education.

6. There shall be a practical examination in all subjects other than Pure Mathematics, and candidates in all subjects other than Applied Mathematics shall be required to pass in the practical portion of the examination as well as in the theoretical portion defined in the syllabuses.

In Pure Mathematics there shall be eight papers of four hours each, each carrying 100 marks. In Applied Mathematics and Statistics there shall be 8 full papers carrying total marks of 800 distributed as shown in the syllabus.

In Physics, Geology and Anthropology there shall be five theoretical papers of four hours each, each carrying 100 marks, and the Practical examination shall extend over at least three days and shall carry 300 marks.

In Psychology there shall be five theoretical papers of four hours each, each carrying 100 marks, and the Practical examination shall extend over at least four days and shall carry 300 marks.

In Physiology, there shall be five theoretical papers of four hours each, each carrying 80 marks, and the Practical examination shall consist of four papers extending over at least four days and shall carry 100 marks each.

In Botany there shall be five theoretical papers of one hour's duration each : Papers 1-4, dealing with the common topics shall carry 75 marks each and paper 5 dealing with the topic for detailed study shall carry 100 marks. The Practical examination shall be conducted by five papers extending over at least six days. Papers 1-4, dealing with common topics, shall extend over 4 days at least, and carry 75 marks each. The fifth practical paper, dealing with the topic for detailed study, shall extend over two days at least and carry 100 marks.

In Geography, Zoology and Comparative Anatomy and Education, the papers and marks shall be shown in the syllabus.

In all other subjects there shall be four theoretical papers of four hours each and the Practical examination shall extend over at least four days. The total marks shall be equally divided between the theoretical and practical portions of the examination.

6A. A candidate may be permitted to offer a piece of research work in the subject which he has taken up for the M.A. or M.Sc. Examination, and approved by the Executive Committee of the Post-Graduate Council concerned, in lieu of any two papers in Pure Mathematics and Applied Mathematics and in lieu of one theoretical and one practical paper in other subjects, the papers to be so exempted being decided in each case by the Board of Higher Studies concerned, provided that the candidate has passed the B.A. or B.Sc. Examination with Honours in that subject or in a subject approved by the Board in this behalf. The total marks of the papers exempted shall be either 200 or 180 as the case may be.

7. The limits of the subjects shall be as follows :—

### PURE MATHEMATICS

The subjects in *Pure Mathematics* shall be as follows :—

*Paper I.*—Algebra and Arithmetic.

*Paper II.*—Application of Pure Mathematics.

*Paper III.*—Projective Geometry.

*Paper IV.*—Spherical Trigonometry, Metric Geometry and Differential Geometry.

*Paper V.*—Differential and Integral Calculus.

*Paper VI.*—Infinite Series, Differential Equations, Fundamentals of the Theory of Complex Functions.

*Papers VII and VIII.*—Any one of the following subjects :

- (a) Theory of Functions of a Real Variable.
- (b) Theory of Functions of a Complex Variable.
- (c) Theory of Numbers.
- (d) Theory of Groups.
- (e) Finite Differences and Statistics.
- (f) Higher Curves and Surfaces.
- (g) Foundations of Geometry. Non-Euclidean Geometry and Geometry of the Fourfold.
- (h) Quaternions and Vector Analysis.
- (i) Integral Equations with Applications.
- (j) Elliptic Functions and Higher Transcendentals.
- (k) Calculus of Variations.
- (l) Higher Algebra.
- (m) Topology.
- (n) Riemannian Geometry.



The limits of the subjects shall be defined and books shall be recommended from time to time by the Board of Higher Studies concerned.

One four-hour paper shall be set upon each of the first six compulsory subjects and two papers on the optional subject.

### APPLIED MATHEMATICS

Candidates in *Applied Mathematics* shall be expected to possess a sound general knowledge of a number of compulsory subjects and a detailed knowledge of selected topics as indicated below :—

1-4. Four theoretical papers of 4 hours each, each carrying 100 marks :—

- |  |           |
|--|-----------|
| (a) General Mechanics .. .. .                | 2 papers. |
| (b) Hydromechanics .. .. .                   | 1 paper.  |
| (c) Analysis and Differential Equations .. . | 1 paper.  |

5. One theoretical half paper of  $2\frac{1}{2}$  hours, carrying 50 marks and another half paper comprising a Practical examination carrying 50 marks in the Theory and Practice of Numerical Calculations including Combination of Observations. The two half papers together shall constitute one full paper.

6. One theoretical paper of four hours carrying 100 marks in two subjects to be selected by the candidates from a number of subjects prescribed by the Board of Higher Studies in Applied Mathematics.

Appended is a list of such subjects which may be added to or modified from time to time by the Board :—

- (a) Theory of Potential.
- (b) Spherical Astronomy.
- (c) Elements of the Theory of Electricity.
- (d) Elements of the Theory of Thermodynamics.

7-8. Two papers in one subject to be selected by the candidates from the following list which may be added to or modified from time to time by the Board of Higher Studies in Applied Mathematics :—

- |  |   |
|--|---|
| (a) Mathematical Theory of Elasticity        | } Two papers of four hours each, each carrying 100 marks. |
| (b) Electricity and Magnetism                |   |
| (c) Advanced Hydromechanics                  |   |
| (d) Geodesy and Geophysics                   |   |
| (e) Advanced Dynamics                        |   |
| (f) Celestial Mechanics                      |   |
| (g) Statistical Mechanics and Thermodynamics |   |
| (h) Quantum Mechanics and Wave Mechanics     |   |
| (i) Theory of Relativity                     |   |

- (j) Probability and Mathematical Statistics (one theoretical paper of four hours carrying 100 marks, one theoretical half-paper of  $2\frac{1}{2}$  hours carrying 50 marks and another half paper comprising a Practical examination carrying 50 marks—the two half-papers together shall constitute one full paper).

## CHEMISTRY

Candidates in Chemistry shall be examined in the following :—

- A. Physical Chemistry.
- B. Inorganic Chemistry.
- C. Organic Chemistry.

They will be expected to show a detailed knowledge of any one of these branches and a general knowledge of the other two.

There shall be a Practical examination comprising qualitative and quantitative analysis, and the preparation of chemical specimens.

### PHYSICAL CHEMISTRY (GENERAL)

#### *Theoretical*

#### I. The states of aggregation :—

The Kinetic theory; Avogadro's number; Laws of perfect gases; Maxwell's law of distribution of velocities; actual gases, characteristic equations of gases; theory of corresponding states; gas thermometers; Joule-Thomson effect; graphic representation; liquefaction of gases; specific heats of gases, liquids and solids; diffusion; viscosity; the liquid state; the solid state; characteristic properties of crystals; elementary X-ray analysis of cubic systems.

#### II. Thermodynamics and Thermochemistry :—

The first law of thermodynamics; adiabatic and isothermal processes; reversible and irreversible processes; Carnot's cycle; thermodynamic scale of temperature; standard temperatures; law of radiation; measurement of temperature and of energy; changes accompanying chemical reactions and chemical equilibrium; applications of the first law to chemistry; changes of energy of transformation with temperature.

The second law of thermodynamics; internal energy; free energy; entropy, heat function; activity; partial and total heat quantities; efficiency of natural processes; chemical affinity; Clausius and Clapeyron's equation; variation of solubility with temperature; Le Chatelier and Braun's principle of mobile equilibrium; the Gibbs-Helmholtz equation; the phase rule, chemical and thermodynamic potentials.

### III. Solutions :—

Dalton and Henry's laws; laws of mixtures; partial and total pressure; molar fraction; partial molar quantities; theory of dilute solutions; osmotic pressure and its measurement; the determination of molecular weights; Kirchoff's relation; theory of fractional distillation; Duhem and Margule's equation; properties of membranes; solid solutions.

### IV. Chemical equilibria :—

Measurement of equilibrium constant; effect of temperature and pressure; reaction isotherm and reaction isochore; detailed study of typical examples of homogeneous equilibria in gaseous, liquid and solid systems; heterogeneous equilibrium; simple phase law diagrams; alloys and their properties, transition points.

### V. Kinetics of chemical reaction :—

Conditions determining the velocity of chemical reaction; order of reaction; period of induction; intermediate compounds; acceptor and inductor molecules; active molecules; energy of activation; elements of the theories of catalysis; nature of catalysis and their typical application to industry; promoters; poisons; principles underlying Haber's synthesis of ammonia; detailed study of typical gaseous and liquid systems.

### VI. Electrochemistry :—

Conduction of electricity by electrolytes; outline of the theory of complete dissociation; electrolysis; primary and secondary cells; solution tension of metals; concentration cells; standard electrodes; potentiometric and conductometric titrations; measurement of hydrogen ion concentration; indicators; decomposition potential; electro-analysis; polarisation; capillary electrometer.

### VII. Colloids :—

Surface tension; methods of measurement; surface energy; degree of dispersion; adsorption of gases and of liquids by solids; preparation and properties of colloidal solutions: electro-dialysis; ultra-filtration; stability; electric charge; hydration; coagulation of colloids; protective action; gold number; the ultra-microscope; Brownian movement; sol-gel transformation; iso-electric point; colloidal electrolytes; emulsions.

### VIII. Photochemistry :—

Laws of absorption of light; measurement of absorption of light; Einstein's law of photochemical equivalence; elements of theoretical and experimental photochemistry.

### IX. Radioactivity :—

Measurement of radioactivity; radiations from radioactive substances; the disintegration hypothesis; the displacement law; the three disintegration series; isotopes.

### X. The Atom :—

Elements of the quantum theory.

*Practical*

Determination of v.d., viscosity, surface tension; electrolytic conductivity; e.m.f. of electrolytic cells; heats of neutralisation and solution; identification of spectral lines; refractive index; electrometric titrations; preparation and properties of colloidal solutions; adsorption; hydrogen ion concentration; velocity of reaction; partition co-efficients; solubility; chemical equilibrium; calibration of a thermocouple (usual types); solubility and cooling curves; phase law diagrams of simple aqueous salt systems; molecular weight determinations; optical rotation; measurement of electrochemical equivalent.

Actual number of experiments will be determined from time to time.

## PHYSICAL CHEMISTRY (SPECIAL)

*Theoretical*

In addition to a fuller treatment of the General Course, the following :—

*Solutions*—Solubility, polarity, solvation, internal pressure.

*Electrochemistry*—Liquid junction potential; theory of strong electrolytes; properties of electrolytes in non-aqueous solvents; over-voltage; kinetic salt effect; oxidation reduction potentials; polybasic acids.

*The Quantum theory and atomic structure*—The Quantum theory and its applications to chemistry; the structure of the atom; atomic spectra: valency; non-radioactive isotopes.

*Structure of molecules*—Ionic deformation in relation to theories of valency; dipole moment; polarisation; relation between dielectric constant and refractive index.

*Chemical kinetics*—Chain reactions, typical atomic reactions, ionic reactions, homogeneous and heterogeneous catalysis.

*Photochemistry*—Excitation of atoms and molecules by absorption of light, application of molecular spectra in the study of photochemistry, chain reactions, photosensitisation, photocatalysis and inhibition.

*Thermodynamics*—The Nernst Heat Theorem and its applications.

*Kinetics of chemical reactions*—Classification of chemical reactions, homogeneous and heterogeneous reactions, order of reactions, period of induction, intermediate compounds, acceptor and inductor molecules, active molecules, energy of activation, the mechanism of chemical change. Elements of the theories of catalysis, nature of catalysts and their typical application to industry; promoters, poisons; detailed study of some important industrial reactions in the gaseous and liquid systems.

*Practical .*

In addition to more accurate and extended measurements as under the practical course in Physical Chemistry (General), the following :—

Advanced conductometric and electrometric titrations ; measurements of (a) extinction co-efficients and snapping of absorption spectra, (b) cataphoretic speeds, (c) transport numbers, (d) transition temperatures, (e) photochemical measurements, (f) heat of formation.

## INORGANIC CHEMISTRY (GENERAL)

In addition to a fuller treatment of the subjects prescribed for the B.Sc. Honours Course, the following :—

*Theoretical*

Double and complex salts, Werner's theory, valency and structure of the atom, radioactivity, general methods of accurate, determination of atomic weight, gas analysis and water analysis, application of physico-chemical methods in analysis.

Study of the following elements and their simple compounds :—

Rare gases, beryllium, gallium, indium, thallium, titanium, molybdenum, tungsten, cerium, thorium, zirconium, hafnium, uranium, germanium, vanadium, rhenium, platinum metals ; general properties of rare earths and their general methods of separation.

*Practical*

Qualitative analysis of mixtures containing not more than six radicals, positive or negative (in addition to the acid radicals mentioned in the B.Sc. Honours Course, the following :—Cyanides, thiocyanates, chlorates and ferrocyanides), excluding the rare elements.

Typical inorganic preparations :—Chrome alum, hydrazine sulphate, barium dithionate, sulphuryl chloride, ceric ammonium nitrate, potassium chlorate, chloro-pentamine, cobaltic chloride, hydroxylamine hydrochloride, aluminium chloride.

Quantitative : Bismuthate and Volhard's method, use of adsorption indicators. Estimation of zinc by ferrocyanide. Analysis of brass, german silver, type metal, steel, haematite, dolomite, chromite, pyrolusite and coal.

## INORGANIC CHEMISTRY (SPECIAL)

In addition to a fuller treatment of the subjects prescribed for the General Course, the following :—

*Theoretical*

Atomic structure on the basis of quantum theory, electronic theory of valency, geo-chemistry, crystal chemistry, phase rule (ternary and quaternary systems), inorganic isomerism and stereo-isomerism, iso-dimorphism, iso- and hetero-polyacids, spectroscopic analysis (qualitative and quantitative), alloys and amalgams, intermetallic compounds.

Fuller treatment of the rarer elements including the rare earths.

*Practical*

Qualitative analysis of mixtures containing not more than six radicals (including rarer elements).

Gas and water analysis.

Preparation :—Typical preparations of the complex salts, nickel carbonyl, chromyl chloride, chromous salts, electrolytic preparations.

## ORGANIC CHEMISTRY (GENERAL)

In addition to the B.Sc. Honours Syllabus dealt in a more detailed way, the following :—

*Theoretical*

Haloid hydrocarbons, organo-metallic compounds of zinc and magnesium, saturated and unsaturated aldehydes and

ketones, guanidine and thiourea ; aliphatic diamines, dialdehydes and diketones, keto-carbonic acids, dibasic acids ; more important monobasic and dibasic unsaturated acids, amino-acids ; carbohydrates including arabinose, xylose, galactose, mannose and lactose.

A study of the more important derivatives of benzene, naphthalene and anthracene.

Simpler dyes of the following groups :—Azo, triphenyl-methane, phthalein, rhodamine and anthraquinone.

Furfurane, thiophen and pyrrol ; pyridine, quinoline and isoquinoline, pyrimidine and iminazol and their simple derivatives, theobromine, caffeine and uric acid.

Isolation and general properties of the alkaloids.

Coniine, nicotine, adrenaline, piperine.

General idea of alicyclic compounds and the following :—

Terpineol and its oxidation products, terpinolene and limonene, terpin and cineol, citral, methylheptenone and geraniol menthone, menthene and menthol, camphor and borneol.

Isoprene, butadiene and India-rubber.

### *Practical*

- (a) At least ten organic preparations of different types ;
- (b) identification of any simple organic compound given singly ;
- (c) determination of the equivalent of a base or an acid ; estimation of formaldehyde, sugars, phenol, primary amine (by acetylation, nitrogen (Kjeldahl and Dumas), phenylhydrazine and acetone.

### ORGANIC CHEMISTRY (SPECIAL)

In addition to the General Syllabus, the following :—

### *Theoretical*

Unsaturated compounds (hydrocarbons, aldehydes, acids and ketones ; saturated and unsaturated di- and poly-basic acids, aliphatic diazo compounds ; proteins and polypeptides.

A detailed study of the derivatives of naphthalene, anthracene, phenanthrene, acenaphthene and diphenyl.

Polyhydric alcohols, detailed study of pentoses and hexoses ; disaccharides and trisaccharides ; polysaccharides (inulin, starch, celluloses and glycogen).

More important synthetic and natural dyes.

Alicyclic compounds and their derivatives.

Tannins and depsides.

Five and six membered heterocyclic compounds.

A detailed study of the more important terpenes and camphors.

Detailed study of alkaloids and synthetic drugs. Haematin and related compounds. Carotene and vitamins. Detailed study of the stereochemistry of carbon and other elements ; theories of Organic Chemistry including isomeric changes, molecular re-arrangements and valency.

### *Practical*

Literature preparations, identification of complex organic substances having reactive characteristic groups.

Determination of C, H, N, S and halogens.

Estimation of methoxyl and acetyl groups. Estimation of aldehydes and esters.

Determination of nitro-groups and of unsaturation.

Assay of alkaloids.

The two Special papers will be distributed as follows :—

#### *Physical Chemistry—*

*Paper I.*—Kinetic Theory, Thermodynamics, Chemical equilibria, Kinetics of chemical reactions.

*Paper II.*—Solutions, Electrochemistry, Colloids, Photochemistry, Radioactivity, Structure of atoms and molecules.

#### *Inorganic Chemistry—*

*Paper I.*—Theories and non-metals.

*Paper II.*—Analytical and metals.

#### *Organic Chemistry—*

*Paper I.*—Aliphatic, Aromatic, Theories, Synthetic dyes, Stereochemistry.

*Paper II.*—Natural products, Alkaloids, Terpenes, Heterocyclic compounds, Synthetic drugs.



Candidates must produce note-books of their laboratory work, which must be duly certified by the Professor and shall be taken into account in estimating their qualifications.

## PHYSICS

Candidates in Physics will be expected to possess a sound knowledge of the general principles of the subject including the more fundamental advances made of recent years and a detailed knowledge of a Special selected topic as indicated below :—

Five Theoretical papers shall be set, of which the first three shall cover a general course of Mathematical and Experimental Physics distributed as follows :—

### *Paper I*

Heat and General Physics.

### *Paper II*

Light and Acoustics.

### *Paper III*

Electricity and Magnetism, Electron Theory of Matter.

### *Paper IV*

Modern Physics (Principle of Relativity), Wave Mechanics and Elements of Nuclear Physics.

The detailed syllabus of the subjects mentioned in the first four papers stated above will be framed by the Board of Higher Studies in Physics, which may be modified by the same Board when occasion will arise.

### *Paper V*

The fifth paper shall be set on a special topic, of which the candidate is expected to possess a detailed knowledge.

Appended is a list of such topics\* which may be added to or modified from time to time by the Board of Higher Studies in Physics—

- (a) Electrical Communication and Radio.
- (b) X-Rays and Structure of Matter.
- (c) Advanced Optics (including Spectroscopy).
- (d) Advanced Acoustics.
- (e) Astrophysics and Generalized Relativity.
- (f) Nuclear Physics.
- (g) Geophysics.

The Practical examination shall consist of three parts. The first part shall be so conducted as to test the candidate's general proficiency in Physical Experiments and Measurements. The second and third parts shall test his proficiency in Advanced Physical Experiments and his Practical knowledge of the Special subjects offered by him for the fifth Theoretical paper.

The Laboratory note-books of the candidates shall carry 20 per cent. of the full marks in Practical papers. They shall be inspected at frequent intervals and marked periodically by the teachers under whom the candidates worked at the different Laboratories. These marks will be considered by Examiners at the time of finally adjusting the marks in each Practical test. If the Laboratory note-books are found to be unsatisfactory, the candidates will be disqualified for the examination. In connection with the Practical examination there shall be also a special *viva voce* examination of the candidate on the subject of the experiment, which will carry 20 per cent. of the full marks allotted to that question.

## BOTANY

Candidates in Botany shall be examined in—

- (1) Thallophyta, Bryophyta and Plant Diseases.
- (2) Pteridophyta, Gymnosperms and Fossil Botany.

\* The following special topic has been added to the list by the Board of Higher Studies in Pure Physics :—Statistical Physics.

- (3) Angiosperms and Geographical Botany.
- (4) Physiology, Ecology, Theories of Evolution and Heredity.
- (5) A special topic, of which the candidate is expected to possess a detailed knowledge.

The following is a list of such topics which may be added to or modified from time to time by the Board of Higher Studies in Botany :—

*One of the following subjects—*

- (a) Cytology and Plant Breeding.
- (b) Ecology and Plant Geography.
- (c) Comparative Morphology and Organography.
- (d) Plant Pathology.
- (e) Economic Botany.
- (f) Palaeobotany.
- (g) Plant Physiology.

The Practical examination shall include (a) the making of microscopic sections of plants or parts of plants including staining and application of micro-chemical reagents ; (b) examination, description and identification of microscopic preparations provided by the Examiners or made by the candidates ; (c) examination, description, systematic determination and identification of plants or parts of plants ; (d) the performance of physical or chemical experiments, or the setting up and description of apparatus, relating to the physiology of plants.

Candidates must produce note-books of their laboratory work which must be duly certified by the Professor, and shall be taken into account in estimating their qualifications.

Five theoretical papers, each of 4 hours duration shall be set under the above heads. Papers 1-4, dealing with common topics under (1)-(4) above shall carry 75 marks each. Paper 5, dealing with the topic for detailed study, shall carry 100 marks.

The practical examination shall be by five papers. Papers 1-4, dealing with common topics, shall extend over at least 4 days and carry 75 marks each. Paper 5 dealing with the topic

for detailed study shall extend over two days at least and carry 100 marks.

## PHYSIOLOGY

Candidates in Physiology will be expected to possess a sound knowledge of the general principles of the subject including the more fundamental advances in Physiology made in recent years and a detailed knowledge of the special subjects, theoretical and practical, selected by the candidate for a more searching examination as indicated below.

Five theoretical papers shall be set as follows :—

### *Paper I*

General Physiology and Biophysics of circulation, respiration, alimentation, excretion and reproduction.

### *Paper II*

Biochemistry, physiological application of energetics, surface action, disperse system, permeability of membranes and the properties of the surface of cells, osmotic pressure, electrolytes and their action. H-ion concentration, Donnan equilibrium, enzymes, hormones and vitamins, carbohydrates, lipides, proteins, digestion, metabolism, dietetics, oxidation and reduction, chemistry of blood and other tissue fluids, chemistry of respiration, excretion and reproduction, specific immunological reactions

### *Paper III*

Nervous system and Endocrine organs.

### *Paper IV*

Sense-organs and Nerve-muscle Physiology.

*Paper V*

## (SPECIAL PAPER)

(This shall be set on subjects included in one or other of Papers II, III and IV and shall be of a more searching test.)

The Practical examination in Physiology shall include (1) Biochemistry, (2) Histology, (3) Experimental Physiology or Bio-Physics, (4) Special subject (for this the candidate shall name one of the above subjects in which the test shall be more searching than in the others).

Candidates must produce note-books of their laboratory work, which must be duly certified by the Professor and shall be taken into account in estimating their qualifications.

## ZOOLOGY AND COMPARATIVE ANATOMY

The scope of Zoology in each paper shall be as follows :—

*Theoretical**1st Paper—*

1st Half	.. History of Zoology; General principles of Biology, evidence and theories of evolution; Adaptation ..	.. 40 marks
2nd Half	.. Origin and distribution of animals in space and time ..	.. 40 „

*2nd Paper—*

1st Half	.. Cytology and Genetics ..	.. 40 „
2nd Half	.. Histology and Embryology of vertebrates ..	.. 40

*3rd Paper—*

1st Half	.. The structure, bionomics, affinities, development and classification of invertebrates except Annelida, Arthropoda and Mollusca .. ..	40 marks
2nd Half	.. The structure, bionomics, affinities, development and classification of Annelida, Arthropoda and Mollusca .. ..	40 ..

*4th Paper—*

1st Half	.. The classification of Chordata; the structure, bionomics, affinities of Hemichordata, Urochordata, Cephalochordata and Cyclostomata .. ..	40 ..
2nd Half	.. Biology and comparative anatomy of vertebrates .. ..	40 ..

*5th Paper—*

Any of the following subjects, each distributed into two halves— 40 + 40

- (a) Entomology.
  - (b) Genetics and animal breeding.
  - (c) Fishery.
  - (d) Any other subject as may be determined by the Board of Higher Studies in Zoology from time to time.
- Each half paper shall be of two hours.

*Practical*

The Practical Examination shall carry 400 marks distributed as follows :—

1st day	.. Dissection and microscopic preparations of the invertebrate types .. ..	75 marks
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2nd day	.. Dissection and microscopic preparations of the Chordata types	75 marks
3rd day	.. Identifications .. ..	60 ..
	Examination of laboratory note-books and other sessional preparations submitted by the candidates .. ..	30 ..
4th day	.. Microtom technique .. ..	60 ..
5th day	.. Special :	
	(a) Dissection and identifications	60 ..
	(b) Oral .. ..	20 ..
	(c) Examination of laboratory and field note-books, collections and preparations submitted by the candidates .. ..	20 ..

Candidates must produce note-books of their laboratory work, which must be duly certified by the teachers and shall be taken into account in estimating their qualifications.

## GEOLOGY

1. Candidates who offer themselves for examination in Geology for the M.Sc. Degree may elect to specialize in either—

- (a) The Mineralogical and Petrological branch, or
- (b) The Stratigraphical and Palaeontological branch.

2. In Geology there shall be five theoretical papers, each carrying 100 marks, distributed as follows :—

### *Paper I*

Economic Geology.

### *Paper II*

Petrology and Mineralogy.

*Paper III*

General Geology and Palaeontology.

*Paper IV*

Indian Stratigraphy.

*Paper V*

The fifth paper shall be set on one of the following special topics, of which the candidate is expected to possess a detailed knowledge :—

- (a) Coal.
- (b) Igneous rocks.
- (c) Metamorphic rocks.
- (d) Some selected topics of Palaeontology.

The above list may be added to or modified from time to time by the Board of Higher Studies in Geology.

The practical examination shall carry 300 marks, of which 100 shall be in connection with the special paper.

3. All candidates will be expected to show a knowledge of the history of Geological Science, and to possess an intimate acquaintance with the economic aspects of the branch in which they elect to be examined, with special reference to the mineral deposits of India, their exploitation by indigenous methods in the past, and a knowledge of recent developments.

4. Candidates must produce note-books of their practical work, including field-work in which they participated. These must be duly certified by the teacher, and shall be taken into account in estimating their qualifications.

## PSYCHOLOGY

1. The examination shall consist of the following parts :—

*Theoretical**Paper I*

General Psychology.



*Paper II*

Physiological Psychology.

*Paper III*

Abnormal Psychology.

*Paper IV*

Genetic Psychology.

*Paper V*

One of the following—

- (i) Educational Psychology.
- (ii) Industrial and Vocational Psychology.
- (iii) Advanced Abnormal Psychology.
- (iv) Indian Psychology.
- (v) Social Psychology.

The above list may be added to or modified from time to time by the Board of Higher Studies in Psychology.

*Practical*—Three papers (four days)

(1) (i) Sensation ; (ii) Feeling, Emotion ; (iii) Perception ; (iv) Attention ; (v) Memory, Association ; (vi) Action ; (vii) Physical and Mental work ; (viii) Thought, Will ; (ix) Mental Tests ; (x) The Unconscious, Dream-analysis, Hypnosis ; (xi) Experiments in Animal and Child Psychology.

(2) Every candidate shall also be required to choose in consultation with the Head of the Department of Psychology, a special problem on which he shall carry on intensive experimental work for at least one year under the guidance of a teacher to be nominated by the Board of Higher Studies in the subject. This piece of special work will be examined by the Board of Examiners at the time of the final examination.

(3) The candidates must produce note-books of their laboratory work, which shall be duly certified by the teachers concerned, and shall be taken into account in estimating the candidates' qualifications.

The distribution of marks for the Practical examination shall be as follows :—

Special work chosen	..	..	..	80 marks
Laboratory note-books	..	..	..	20 marks
Other examinations	..	..	..	200 marks

Students must possess a working knowledge of the principles and applications of statistical methods.

The limits of the subjects shall be defined and books shall be recommended from time to time by the Board of Higher Studies in Psychology.

## ANTHROPOLOGY

The course in Anthropology shall include both Physical and Cultural Anthropology. Physical Anthropology shall be studied from the zoological, palaeontological, physiological, psychological and ethnological points of view. Cultural Anthropology shall be studied from the archaeological, technological, sociological, linguistic and ethnological points of view. The entire subject shall be treated with special reference to Indian conditions and problems, past and present. Candidates shall be expected to possess a general knowledge of such subsidiary subjects as archaeology, human anatomy, geography, psychology, zoology, physiology, statistics with special reference to biometrics, in so far as such acquaintance is necessary for the proper understanding of anthropology; but they shall not be required to pass a special examination in the subsidiary subjects.

This course shall be as follows :—

*Theoretical*—5 papers (100 marks each)—

### *Paper I*

Comparative Anatomy of the Primates. Human Palaeontology. Evolution.

### *Paper II*

Racial Somatology. Anthropology. Racial Pre-history.

*Paper III*

Evolution of Culture including Pre-history and Material Culture of Primitive peoples.

*Paper IV*

Primitive Society and Religion.

*Paper V*

## GROUP A

Human Heredity and Racial Hygiene. Biometry.

## GROUP B

Advanced Social Anthropology. Intensive study of some Primitive Tribes.

## GROUP C

Culture Analysis of higher elements in Indian Society. Intensive study of some Castes.

*Practical*—3 papers (100 marks each)—

*Paper VI*

Human Osteology. Somatometry. Craniometry.

*Paper VII*

Pre-historic Archaeology. Technology. General Field Work.

*Paper VIII*

Advanced Group Practical (and Pre-history).

## GROUP A

Osteometry. Primate Osteology. Fossil men.  
Typical Pelistocene fossil mammals.  
Preservation of bones.

## GROUP B and GROUP C

Technology, with special reference to the material culture of the Tribe (Group B) or Area (Group C) to be studied. Museum Methods. Field work to collect cultural data.

Detailed syllabuses will be prescribed and books recommended from time to time by the Board of Higher Studies concerned, so as to indicate the extent and standard of knowledge required.

## STATISTICS

1. The course in Statistics shall be divided into a number of groups. The first four papers of each group shall be identical and shall consist of three written papers, each of four hours and each carrying 100 marks and a Practical examination (extending over at least one day) carrying 100 marks.

*Papers I and II*

General Methods of Statistics.

*Paper III*

Applied Statistics.

*Paper IV***Practical Examination.**

2. The remaining four papers shall be taken from any one of the following groups :—

**GROUP A**

**Mathematical Statistics.**

**GROUP B**

**Economic and Business Statistics.**

**GROUP C**

**Applied Statistics.**

In each group there shall be two written papers of four hours each, each carrying 100 marks and a Practical examination carrying 200 marks but in the case of Group A (Mathematical Statistics) the candidates shall have the option of taking two papers in Mathematics approved by the Board of Higher Studies in Statistics in lieu of the Practical examination.

3. Candidates must produce Note-books of their laboratory work which must be duly certified by the Professor and shall be taken into account in estimating their qualifications.

4. The list of groups may be added to or modified from time to time by the Board of Higher Studies in Statistics. The detailed distribution of papers in each group shall be settled time to time by the Board of Higher Studies in Statistics.

5. The syllabus for each paper shall be defined and books shall be recommended from time to time by the Board of Higher Studies in Statistics to indicate generally the extent and standard of knowledge required.

## GEOGRAPHY

The course in Geography shall be as follows :—

*Paper I*

Geomorphology and Climatology .. .. 100 marks

(Candidates who have passed the B.A. or B.Sc. (Honours) Examination in Geography with Climatology as a special topic will have to offer Oceanography in lieu of Climatology.)

*Paper II*

Principles of Plant, Economic and Human Geography. 100 marks

*Paper III*

Regional Geography of India and adjoining countries with a fuller treatment of one small region— 100 marks  
(the region to be prescribed from time to time by the Board of Higher Studies in Geography).

*Paper IV*

Regional Geography of not less than two selected areas not included in Paper III (the areas to be prescribed from time to time by the Board of Higher Studies in Geography). 100 marks

*Papers V and VI*

One of the following special subjects either from Group A or from Group B :— 200 marks

## GROUP A

*Geology—*

Part I. Structural and Economic Geography.

Part II. Geology of India.

Practical.

*Cartography—*

Part I. Surveying and Map Making.

Part II. Map projections and Surveying instruments.

Practical.

*Meteorology—*

Part I. Principles of Meteorology.

Part II. Weather conditions in selected regions.

Practical.

*Pedology—*

Part I. Properties of soil and their distribution ; Soil Erosion.

Part II. Utilisation of Land ; Natural and cultivated Vegetation.

Practical.

(Each part in each subject shall carry 75 marks and the Practical examination 50 marks.)

## GROUP B

*Cultural Landscape—*

Part I. Roads, Railways and Waterways ; Irrigation.

Part II. Human Settlements—villages, towns and markets.

Practical.

*Historical Geography—*

Part I. Historical Geography of one selected country (the country to be prescribed from time to time by the Board of Higher Studies in Geography).

Part II. History of Geographical Knowledge and Explorations.

Practical.

*Political Geography—*

Part I. Principles of Political Geography.

Part II. Political Geography of one selected region (the region to be prescribed from time to time by the Board of Higher Studies in Geography).

Practical.

(Each part in each subject shall carry 75 marks and the Practical examination 50 marks.)

(The list of Special subjects may be added to or changed from time to time by the Board of Higher Studies in Geography.)



*Practical**Papers VII and VIII*

Surveying and construction of maps, charts and diagrams. Interpretation of topographical and geological maps. Identification of raw and fabricated materials. 200 marks

Candidates must produce Note-books of their Laboratory work and Field work, which must be duly certified by the Professor. The Note-books shall be examined and marked by the Examiner. 50 marks out of the 200 marks assigned for Practical examination under Papers VII and VIII shall be allotted to these Note-books.

The syllabus for each paper shall be defined and books shall be recommended from time to time by the Board of Higher Studies in Geography to indicate generally the extent and standard of knowledge required.

## EDUCATION

The course in Education shall be as follows :—

*Paper I*

The General Principles of Education and the Development of Educational Theory. 100 marks

*Paper II*

Educational Psychology and Educational Sociology. 100 marks

*Paper III*

Educational Measurements and Experimental Pedagogy. 100 marks

*Paper IV*

The General History of Education—

- (a) General (selected periods of selected countries). 50 marks
- (b) Ancient and Mediaeval India's contribution to Education. 50 marks

*Paper V*

The Theory, History and Present State of Educational Institutions and Administration in India. 100 marks

*Paper VI*

One of the following special subjects :— .. 100 marks

- (A) Comparative Education—The Educational System of some country or countries outside India approved for this purpose by the Board of Higher Studies in Education.
- (B) Statistics in Education (a knowledge of Mathematics up to the B.A. or B.Sc. standard will be required from candidates taking up this special paper for his M.A. or M.Sc. degree in Education).
- (C) Methodology of Instruction in *one* of the following subjects :—
  - (i) Language and Literature (with special reference to Bengali or English or an Ancient or Modern Language).

- (ii) History and Civics (including social science).
- (iii) Geography (including elements of Geology).
- (iv) Mathematics (including elements of Astronomy).
- (v) Physical Sciences (Physics and Chemistry).
- (vi) Biological Sciences (Botany, Zoology and Physiology).

A candidate will not be allowed to offer one of the subjects set forth under (C) above, or to submit a thesis dealing with the Methodology of Instruction in any subject unless he has previously taken Honours in his B.A. or B.Sc. degree or he is an M.A. or M.Sc. in that subject or in an allied subject. The Executive Committee of the relevant Council of Post-Graduate Teaching shall have power, in very special cases, to exempt a candidate from fulfilling this condition.

(D) Educational classics. One or more works as may be prescribed by the Board of Higher Studies in Education.

(E) Mental Hygiene and Child Guidance.

(F) Educational and Vocational Guidance and Industrial Psychology.

(G) Educational Organisation and Administration.

(H) Special Education.

The Syndicate shall have the power to add to or modify the above lists on the recommendation of the Board of Higher Studies in Education, approved by the Executive Committee.

Practical      ..              ..              ..              ..      200 marks

(A) Every candidate will be examined on Practical Teaching and Class Management for three periods; 100 marks will be assigned for this part of the examination of which 25 marks shall be reserved for *viva voce* examinations. The examiners will be at liberty to apply, without previous notice, any further test they may deem desirable in order to form an opinion of the candidate's competence as a teacher in the subjects which he professes or of his organising ability.

(B) Every candidate will also be examined as regards his ability to carry on or perform suitable experiments in pedagogy and Psychological tests: 50 marks shall be assigned to this part of the Practical examination.

(C) Every candidate must produce Note-books of his Laboratory work and Class Teaching work, which must be duly certified by the teacher. The Note-books shall be examined and marked by the Examiners. 50 marks out of 200 marks assigned for Practical examination under Papers VII and VIII shall be allotted to these Note-books.

The syllabus for each paper shall be defined by the Syndicate on the recommendation of the Board of Higher Studies on Education, approved by the Executive Committee and books shall be recommended from time to time by the Board of Higher Studies in Education to indicate generally the extent and standard of knowledge required.

A candidate who is permitted to offer a piece of research work in terms of Section 6A of these Regulations will be exempted from appearing in Paper VI and one other paper granted by the relevant authority, carrying a total of 200 marks. The number of marks assigned to the thesis and *viva voce* examination thereon shall be 200.

The conditions to be fulfilled by a candidate who is allowed to offer a thesis are as follows :—

(a) He must have completed one year's study of the M.A. or M.Sc. course in Education under University Lecturers or in a college affiliated in the subject up to the M.A. or M.Sc. standard.

(b) He must, at the end of the year, submit to the Board of Higher Studies in Education, an application for permission to offer a thesis in lieu of part of the examination.

(c) The application shall indicate the subjects and scope of the thesis he wishes to offer and must be recommended by the Professor or Professors under whom he has been working.

(d) If the application be granted by the Board of Higher Studies in Education, the thesis must be prepared under the general direction of the Professor or Professors with whom the candidate is prosecuting his studies.

(e) The candidate shall deliver *three copies* of the thesis (printed or type-written) to the Secretary to the Councils of Post-Graduate Teaching in Arts and Science at least one month before the first day of the M.A. or M.Sc. Examination at which he intends to present himself.

(f) The thesis shall be examined by a Board of three examiners. The name of a candidate whose thesis has been approved shall be marked with an asterisk in the list of successful candidates published in the Gazette and also in the University Calendar.

## GENERAL

8. (a) In order to pass in Pure Mathematics a candidate must obtain 288 marks. No minimum pass marks shall be required in each paper, but if in any paper a candidate obtains less than 25 marks, those marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

(b) In order to pass in Applied Mathematics a candidate must obtain 288 marks. No minimum pass marks shall be required in each paper, but if in any paper a candidate obtains less than 25 marks those marks shall not be included in the aggregate, provided, however, that if any candidate obtains not less than 30 per cent. of the marks in the Practical portion of the examination in a paper, all marks in that paper shall be included in the aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

(c) In order to pass in any subject other than Pure Mathematics, Applied Mathematics, Physics, Botany, Physiology, Geology, Psychology, Statistics, Geography and Zoology and Comparative Anatomy a candidate must obtain 132 marks in the aggregate of the four Theoretical papers and 160 marks in the Practical examination. If in any Theoretical paper a candidate obtains less than 25 marks, these marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

(d) In order to pass in Physics, Geology, Psychology, and Anthropology a candidate must obtain 165 marks in the aggregate of the five Theoretical papers and 120 marks in the Practical examination. If in any Theoretical paper a candidate obtains less than 25 marks, these marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

(e) In order to pass in Botany, Physiology and Zoology and Comparative Anatomy a candidate must obtain 132 marks in the aggregate of the five Theoretical papers and 160 marks in the Practical examination. If in any Theoretical paper a candidate obtains less than 25 per cent. of the total marks, these marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

(f) In order to pass in Statistics a candidate must obtain 165 marks in the aggregate of the five theoretical papers and 40 marks in the compulsory practical examination in compulsory subjects (Paper IV) and 80 marks in the practical examination in the optional subjects or 66 marks in the two papers in Mathematics. If in any theoretical paper a candidate obtains less than 25 marks, these marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

(g) In order to pass in Geography, a candidate must obtain 33% of the aggregate marks prescribed for theoretical papers and 40% of the marks set apart for the Practical examination. If in any theoretical paper a candidate obtains less than 25 per cent. marks, these marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

9. As soon as possible after the examination the Syndicate shall publish a list of candidates who have passed in each subject arranged in three classes and in order of merit. Candidates shall be bracketed together, unless the Examiners are of opinion that there is clearly a difference in their merits.

Each successful candidate shall receive with his Degree of M.Sc. a certificate setting forth the subject in which he was examined, and the class in which he was placed.

10. The candidate, who is placed first in the First Class in each subject (comprising groups, if any), shall receive a Gold Medal and a prize of books to the value of Rs. 200, and the candidate who is placed second in the First Class in each subject (comprising groups, if any), shall receive a Silver Medal and a prize of books to the value of Rs. 100. In subjects (comprising groups, if any) common to both the M.A. and the M.Sc. Examinations, the medals and prizes shall be awarded on the combined results of the M.A. and M.Sc. Examinations :

Provided that the Gold or Silver Medal shall not be awarded to the candidate if he does not secure First Class marks in the aggregate in the common papers in the subject.

The candidate who obtains the highest number of marks in each group comprised in a subject and has been placed in the First Class shall receive a prize of books to the value of Rs. 100 provided he has not obtained any medal or prize under the preceding clause.

11. In all cases where a candidate is allowed to substitute a piece of research work for part of the examination the following conditions shall be observed :—

- (a) He must have completed one year's study including a full course in the subject in which he intends to offer a piece of research work.
- (b) He must at the end of the year in question submit to the Syndicate an application for permission to offer a piece of research work in lieu of part of the examination.
- (c) The application shall indicate the particular piece or research which he wishes to take up and must be recommended by the professor or professors under whom he has been working.
- (d) If the application be granted by the Syndicate the research must be carried on under the direction of the professor or professors with whom the candidate is prosecuting his studies.
- (e) The candidate shall draw up a complete report of the particular research work done by him and shall deliver this report to the Registrar at least a month before the first day of the M.Sc. Examination at which he intends to present himself.
- (f) Every candidate submitting a thesis at the M.A. (Science) or M.Sc. Examination shall be subjected to a *viva voce* examination on the thesis with a view to testing his acquaintance with any previous work that has been done in the particular line of research taken up by him. The *viva voce* examination shall be jointly conducted by the Internal Examiner and one of the External Examiners appointed to examine the thesis ; and 25 per cent. of the marks allotted to the thesis shall be set apart for the *viva voce* examination of the candidate.

- (g) Every candidate submitting a thesis at the M.A. (Science) or M.Sc. Examination and appearing at one or more practical papers must in order to pass in the practical examination obtain at least 40 per cent. marks on the average of the total marks assigned to the practical examination.
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## CHAPTER XXXVII-A

### MASTER OF SCIENCE (TECHNOLOGY)

1. An examination for the Degree of Master of Science (Technology) shall be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. A candidate who has passed the B.Sc. Examination with Physics, Chemistry and Mathematics and preferably with Honours in any of these subjects may be admitted to the examination for the Degree of Master of Science (Technology), provided he has prosecuted a regular course of study for not less than three academic years in a college or colleges affiliated to the University in respect of that subject and standard or in the Post-Graduate Classes of the University.

A candidate who has passed the B.Sc. (Tech.) Examination in any subject may, however, be admitted to the examination for the Degree of Master of Science (Technology) in the same subject provided he has prosecuted a regular course of study for not less than two academic years in a college or colleges affiliated to the University in respect of that subject and standard or in the Post-Graduate Classes of the University.

3. The Examination shall be held in any of the following subjects or such other subject or subjects as may be determined by the Syndicate from time to time :—

- (i) Applied Physics.
- (ii) Radio-Physics and Electronics.
- (iii) Applied Chemistry.

4. The course of studies for the examination for the Degree of Master of Science (Technology) shall be for three years and the examination shall be held in two parts—Part I Examination at the end of the Second-year of the course and Part II Examination at the end of the Third-year of the course.

5. There shall be five theoretical papers and five practical papers for Part I Examination. Such theoretical papers shall be of four hours and shall carry 100 marks. Each practical paper shall be of 100 marks out of which 20 marks shall be set apart for sessional work, as recorded in the notes taken at the time of working in the laboratory or workshop and 20 marks for *viva voce*.

6. For Part II Examination, there shall be three theoretical papers, of which two shall be set on the particular branch of the subject a candidate elects to specialise in. Each theoretical paper shall be of four hours and shall carry 100 marks. The Practical examination shall relate to the special branch of study by the candidate and carry 200 marks.

A candidate may be allowed to submit a design or project work or a piece of research work relating to the special subject in lieu of the practical examination under the following conditions :—

- (a) He must at the beginning of the third year course submit to the Executive Committee of the Council of Post-graduate Teaching in Technology, an application for permission to offer a design or project work or a piece of research work relating to the special subject in lieu of the practical examination as stated above.
- (b) The application shall indicate the particular work which the candidate wishes to take up and must be recommended by the teacher under whose guidance he intends to work.
- (c) If the application be granted by the Executive Committee of the Council of Post-graduate Teaching in Technology, the work must be carried on under the direction of the teacher who recommended the candidate's application.
- (d) The thesis embodying the work carried out by the candidate shall be delivered to the Controller of Examinations at least a month before the first day of the Part II M.Sc. (Tech.) Examination at which the candidate intends to present himself.

7. Every candidate for admission to Part I or Part II Examination shall send in to the Registrar his application with a certificate in the form prescribed by the Syndicate together with a fee of Rs. 50 for Part I Examination and Rs. 75 for Part II Examination, not less than two months before the date fixed for the commencement of the examination.

A candidate, who fails to pass or to present himself for examination after being registered for the same shall not be entitled to a refund of the fee.

8. A candidate who fails to register or to pass or present himself for the examination immediately after completion of his course of studies may be admitted to one or more subsequent examinations on payment of the prescribed fee on each occasion subject to the provision that he prosecutes a regular course of study in a college affiliated in the subject or in the Post-graduate classes of the University for at least six months during the academic year immediately preceding the examination.

9. In order to pass the Part I Examination, a candidate must secure 40 per cent. in the aggregate for the theoretical papers and 40 per cent. in the aggregate for the practical papers respectively and 50 per cent. of the total full marks for the Part I Examination.

10. As soon as possible after the Part I Examination, the Syndicate shall publish a list of successful candidates who have qualified for the Part II Examination arranged alphabetically.

11. In order to pass the M.Sc. (Tech.) Examination a candidate must secure 40 per cent. in the aggregate for the theoretical papers, 40 per cent. in the aggregate for the practical papers and 50 per cent. of the total full marks for the Part II Examination.

12. As soon as possible after the Part II Examination the Syndicate shall publish a list of successful candidates arranged in order of merit on the combined results of Part I and Part II Examinations in two classes. Candidates obtaining 66 per cent. of the total full marks for the two examinations shall be placed in the First Class and those obtaining 50 per cent. in the Second Class.

## CHAP. XXXVII-A MASTER OF SCIENCE (TECHNOLOGY)

The Degree of M.Sc. (Tech.) will be awarded on the combined results of Part I and Part II Examinations but only after the candidate has satisfactorily completed a course of practical training for a period as determined by the Board of Higher Studies in Technology in the respective subjects and produced a certificate to that effect. The works training is to be taken in a factory, workshop or institution selected by the Head of the Department.

13. The candidates who is placed first in the First Class in each subject shall receive a Gold Medal and prize of books to the value of Rs. 200 and the candidate who is placed second in the First Class shall receive a Silver Medal and a prize of books to the value of Rs. 100, provided that the Gold or Silver Medal shall not be awarded to the candidate if he does not secure First Class marks in the aggregate in the Part I Examination.

14. The courses for Part I and Part II of the Examinations in Applied Physics, Radio-Physics and Electronics, and Applied Chemistry shall be as follows :—

### APPLIED PHYSICS

#### *Part I*

##### *Theoretical—*

- |                                   |    |  |
|-----------------------------------|----|--|
| Paper I                           | .. | (a) Engineering Mathematics.                             |
|                                   |    | (b) A. C. Theory and Circuits.                           |
| Paper II                          | .. | (a) Machine Tools  |
|                                   |    | (b) Applied Mechanics and Hydraulics.                    |
| Paper III                         | .. | (a) Applied Heat and Thermodynamics.                     |
|                                   |    | (b) Applied Optics.                                      |
| Paper IV—Electrical Technology—I. |    |  |
|                                   |    | (a) Applied Electronics.                                 |
|                                   |    | (b) Electrical Measurements.                             |
| Paper V—Electrical Technology—II  |    |  |
|                                   |    | (a) Electrical Machine.                                  |
|                                   |    | (b) Electrical Power Transmission and Dis-<br>tribution. |

*Practical—*

- Paper I .. Engineering Drawing and Surveying.  
 Paper II .. Machine Tools Practice and Materials Testing.  
 Paper III .. Thermal and Optical Measurements.  
 Paper IV .. Electrical Measurements and Standardisation.  
 Paper V .. Electrical Machines Testing.

*Part II*

*Theoretical—*

- Paper I .. (a) Industrial Administration.  
 (b) Industrial Economics.

Papers II and III—Elective subject—

One of the following may be chosen—

- (1) Engineering Materials and Machine Design.
- (2) Refrigeration Engineering and Air-Conditioning.
- (3) Optical Engineering and Illumination Technology.
- (4) Advanced Electrical Measurements and Instrument Technology.
- (5) Electrical Machine Design and Power Supply Technology.

*Practical—*

The practical examination shall comprise the following :—

- (i) Practical Test and Sessional work.
- (ii) Industrial Problem and *Viva Voce*.

The above list of subjects may be modified or enlarged from time to time by the Syndicate on the recommendation of the Board of Higher Studies in Applied Physics when necessary.

## RADIO-PHYSICS AND ELECTRONICS

*Part I*

*Theoretical—*

- Paper I .. (a) Electrical Measurements.  
 (b) Theory of Electrical Machines.

- Paper II .. (a) Engineering Mathematics.  
 (b) Physics of Electron Tubes.
- Paper III .. (a) Network Theory.  
 (b) Line Communication Engineering.
- Paper IV .. (a) Transmission Lines and Aerials, Electromagnetic Theory and Wave Guides.  
 (b) Micro-wave Technique and Radar.
- Paper V .. (a) Radio Engineering.  
 (b) Engineering Electronics.

*Practical—*

- Paper I .. Engineering Drawing and Workshop Practice.
- Paper II .. Testing of Electrical Machines and Power Supply Equipments.
- Paper III .. Line Communication Engineering and Engineering Electronics.
- Paper IV .. Radio Engineering Practice.
- Paper V .. U.H.F. and Micro-wave Technique.

*Part II**Theoretical—*

- Paper I .. (a) Industrial Administration.  
 (b) Industrial Economics.

Papers II and III Elective subject—

Any one of the following may be chosen—

- (1) Radio Engineering.
- (2) Micro-wave Technique.
- (3) Television Engineering.
- (4) Radio Propagation and Upper Atmosphere.
- (5) Line Communication Engineering.

*Practical—*

The practical examination shall comprise the following—

- (i) Practical Test.
- (ii) Sessional Work.
- (iii) *Viva Voce*.

The above list of subjects may be modified or enlarged from time to time by the Syndicate on the recommendation of the Board of Higher Studies in Radio-Physics and Electronics.

## APPLIED CHEMISTRY

## Part I

*Theoretical—*

- |           |    |  |
|-----------|----|--|
| Paper I   | .. | Fundamental Chemistry.                                   |
| Paper II  | .. | (a) Inorganic Chemical Technology.                       |
|           |    | (b) Organic Chemical Technology.                         |
| Paper III | .. | (a) Applied Physical Chemistry.                          |
|           |    | (b) Industrial Chemical Calculations.                    |
| Paper IV  | .. | (a) Principles of Mechanical and Electrical Engineering. |
|           |    | (b) Fuels and Furnaces.                                  |
| Paper V   | .. | Chemical Engineering.                                    |

*Practical—*

- |                  |    |  |
|------------------|----|--|
| <b>Paper I</b>   | .. | Inorganic Chemical Technology.   |
| <b>Paper II</b>  | .. | Organic Chemical Technology.   |
| <b>Paper III</b> | .. | (a) Applied Physical Chemistry.<br>(b) Biochemistry.                           |
| <b>Paper IV</b>  | .. | Chemical Engineering.  |
| <b>Paper V</b>   | .. | (a) Mechanical and Electrical Engineering<br>Practice.<br>(b) Machine Drawing. |

## Part II

*Theoretical—*

- Paper I .. (a) Industrial Administration.  
(b) Industrial Economics.

Papers II and III Elective subject—

Any one of the following may be chosen—

- (1) Applied Biochemistry.
- (2) Silicate Industries.
- (3) Oil Technology.
- (4) Pharmaceutical Industry.
- (5) Plastics.
- (6) Advanced Chemical Engineering.

*Practical—*

- (i) Practical Test and Sessional Work.
- (ii) Industrial Problem and *viva voce*.

The above list of subjects may be modified or enlarged by the Syndicate from time to time on the recommendation of the Board of Higher Studies in Technology in Applied Chemistry when necessary.

15. The limits of the courses shall be determined by the Syndicate and modified from time to time, if necessary, on the recommendation of the Board of Higher Studies in Technology in the subject concerned.

## CHAPTER XXXVII-B

### CERTIFICATE IN APPLIED PSYCHOLOGY

1. An examination for the Certificate in Applied Psychology shall be held annually in Calcutta in the month of June or at such time as may be fixed by the Syndicate.

2. A candidate who has passed one of the undermentioned examinations or has otherwise satisfied the Executive Committee of the Council of Post-Graduate Teaching in Arts that he possesses special qualifications for prosecuting the course, will be eligible for admission to the examination, provided that he has prosecuted a regular course of study in Applied Psychology for one academic session in the Post-Graduate Department of the University :—

Master of Arts or Science in Psychology.

Bachelor of Arts or Science with Psychology as one of the subjects.

Bachelor of Teaching.

Bachelor of Medicine and Surgery.

3. Every candidate shall send in his application with a Certificate in the form prescribed by the Board of Higher Studies in Psychology and a fee of Rupees Thirty (30) to the Registrar not less than six weeks before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass or to appear at the examination may be admitted to any one or more subsequent examinations for the Certificate in Applied Psychology on payment of a like fee of Rupees Thirty (30) on each occasion, provided he produces a certificate from the Head of the Department showing that he has prosecuted a further course of study for a period of six months.

5. The examination shall be written, practical and oral and shall be conducted on the lines of syllabus to be drawn up from time to time by the Board of Higher Studies in Psychology and approved by the Executive Committee. The paper-setters and the examiners shall be appointed by the Executive Committee on the recommendation of the Board. The written examination shall consist of one special and two general papers of 100 marks each. Each paper shall be of 3 hours. There shall be a practical examination consisting of one general paper



and one special paper of 100 marks each. The laboratory note-books and the field records of the candidates shall carry 20 per cent. of the full marks in the practical paper. There shall also be an oral examination to test the general knowledge of the candidate in the subject, which shall carry 10 per cent. of the full marks in the practical papers.

6. In order to pass the candidate must obtain at least 60 marks in the two general theoretical papers, 40 marks in the special paper and 80 marks in the practical examination and in the aggregate at least 50 per cent. of the total marks in the theoretical and the practical papers.

In order to be placed in the First Division candidates must obtain 66 per cent. of the total marks. The rest of the successful candidates will be placed in the Second Division.

7. As soon as possible after the examination the Syndicate shall publish a list of successful candidates arranged in two classes and in order of merit. Each successful candidate shall be given a certificate in the form prescribed in Appendix A.

8. The course of study shall be as follows :—

### *Theoretical*

*Paper I.*—General and Applied Psychology (including Mental Testing and Statistics). 100 marks

*Paper II.*—Social Psychology and Abnormal Psychology. 100 marks

*Paper III.*—Special Theoretical paper :—One of the following— 100 marks

- (a) Vocational and Industrial Psychology.
- (b) Social Psychology.
- (c) Education of Defectives and Mental Deficients.

### *Practical*

*Paper IV.*—General .. .. 100 marks

*Paper V.*—Special .. .. 100 marks

Candidates must produce their note-books for Practical and Field Works which must be duly certified by teachers and shall be taken into account and marked by Examiners.

		Lectures per week	Minimum No. of lectures
<b>I. Theoretical—General Course of Study :—</b>			
(i)	General and Applied Psychology.	1	25
(ii)	Social Psychology ..	1	25
(iii)	Abnormal Psychology ..	1	25
(iv)	Mental Testing and Statistics	1	25
<b>II. Theoretical—Social Course of Study :—</b>			
	Group A—Advanced Industrial Psychology.	4	100
	Group B—Advanced Social Psychology and Psychiatric Problems.	4	100
	Group C—Child Psychology and Mental Deficiency.	4	100
		Hours per week	Minimum No. of hours
<b>III.</b>	Practical—General .. ..	2	50
<b>IV.</b>	Practical—Special .. ..	5	125
<b>V.</b>	Field Work—General .. ..	4	100
<b>VI.</b>	Field Work—Special .. ..	5	125

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## CHAPTER XXXVII-C

### DIPLOMA IN SOCIAL WORK (LABOUR WELFARE)

1. An examination for a Diploma in Social Work shall be held in Calcutta on such date as the Syndicate may determine from time to time on the recommendation of the Social Work Committee.

2. Any candidate who has passed an examination for a Bachelor's Degree in any Faculty of this University or who is accepted by the Social Work Committee on the ground that he has worked for at least a period of one year as Labour Welfare Officer in approved institutions, associations or firms employing labour, may be admitted to the examination for the Diploma in Social Work, provided he has prosecuted a regular course of study for one academic year or such shorter period as may be determined by the Syndicate on the recommendation of the Social Work Committee provided for in Section 3 below and has undergone a practical training in an industrial area or areas or labour welfare centres.

3. There shall be a Social Work Committee to be nominated by the Syndicate every two years, and the constitution of the Committee will be determined by the Syndicate from time to time.

4. Every candidate for admission to the examination shall send his application to the Controller of Examinations with a certificate in the form prescribed by the Social Work Committee and a fee of Rs. 60, not less than three weeks before the date fixed for the commencement of the examination.

5. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of Rs. 60 on each occasion.

If a student, after completion of the regular course of study for the examination does not register himself as a candidate for, or does not present himself at, or fails to pass the examination immediately succeeding such completion, he may appear at any of the two following examinations on payment of the prescribed fee only. No such candidate will be allowed to appear at any subsequent examination, unless he prosecutes a fresh course of study as required under Section 2 above.

6. If a candidate is unsuccessful at the examination on account of his failure to secure pass marks in one written paper only, but obtains 50 per cent. marks in aggregate in other papers he may appear for re-examination in the written paper in which

he has failed on payment of a fee of Rs. 30 at the next examination and if he obtains 50 per cent. of marks in that paper at the re-examination he will be declared to have passed the examination as a whole.

7. The examinations shall be written and oral and shall be conducted on the lines of the syllabus defined below. The examiners shall be appointed by the Syndicate on the recommendation of the Social Work Committee.

8. The written examination shall consist of six papers and the oral examination of four papers, of 100 marks each.

In order to pass a candidate must obtain 40 per cent. of marks in each paper and 50 per cent. of marks in the aggregate. Candidates obtaining 60 per cent. of marks in the aggregate shall be placed in the First Class, and those obtaining 50 per cent. or more in the Second Class.

9. As soon as possible after the examination the Syndicate shall publish a list of candidates who have passed, arranged in two classes, both in order of merit. Names of candidates who pass the examination under Section 6 above shall be published separately, arranged in alphabetical order without any class. Every successful candidate shall receive a Diploma in the form entered in the Appendix.

10. The following syllabus defines the limits of the subjects prescribed for the examination. This syllabus may be revised by the Syndicate from time to time on the recommendation of the Social Work Committee. Books to be read for the course shall be prescribed or recommended, when necessary, by the Social Work Committee.

### *Courses of Instruction*

(Social Work Course)

(Labour Welfare)

## I. SOCIOLOGY

Family and Marriage in primitive society. Evolution of Monogamy, Types of family, Patriarchal and Matriarchal families; the Joint or Undivided family. Wider groupings Clan. Tribe and Nation. Functions of the family in relation to the wider groupings. The place of the family in society. Family a universal unit in human society, family feeling a true root-interest (the futility of types of idealism which seeks to destroy family feeling). The child and the family, rights and obligations of family members.

Property. Primitive Communism; the character and extent of primitive communism. Ownership by family or group

rather than real communism. Notion of private property not absent. Private property—justification of private property and development of personality. Occupational groupings; Class and Caste. Development of authority through the family, the clan and tribe. The emergence of nation-states with regular governmental machinery. The basis of community, the place of force and consent; conditions governing life of communities; mutual need crossed by mutual pressure and constraint. Rights and Duties of individuals *vis-a-vis* the community.

*N.B.*—Emphasis will be laid on the study of Social institutions and conditions as they are in India with special reference to the particular area in which the Labour Officers may have to work.

## II. APPLIED ECONOMICS

(a) (i) Industry in India with particular reference to the development, present position and problems of the Coal, Iron and Steel, Cotton Textile and Jute industries.

(ii) Taxation—its effects on employers and employees.

(b) The worker in industry—survey of the condition of the worker.

(i) Europe and America: General historical survey; cottage industries before the industrial revolutions; the industrial revolutions: Urbanisation; the emergence of the industrial proletariat: survey of the conditions of workers in the course of evolution of industries.

(ii) India: Survey of India's Industrial population, origins, the movement to the towns, links with the village and agricultural community, seasonal movements of labour, social problems caused by conditions in urban areas, emergence of a truly urban industrial population.

(c) Factory Labour Organisation—a comparative study of methods of recruitment, training, management, rationalisation and wages.

Methods of recruitment—the *Sirdary* system, methods, training, development of apprenticeship system, skilled personnel, wage system here and in the West, scientific management and efficiency, methods of payment, minimum wage regulation, rationalisation and problems of labour management.

(d) Labour Legislation—Economic aspects of legislation on industries and industrial workers.

(1) Historical background—Europe. America. India, developments in Western countries; the place of the International Labour Organisation, its constitution, functions, ideas. The worker's charter; how present-day developments in War—President Roosevelt's 'Four Freedoms' for instance—affect the position; likely trends in India.

(2) India's position—particularly, history of labour legislation in India, main defects and gaps as compared with Western countries, dangers in rigid adherence to Western practices in legislation as only methods of applying accepted principles to labour in this country, labour and constitution, the place of the Central and Local Governments in legislation, consequences of divergencies in standards through unfettered discretion of provinces to legislate, study of recent trends in Federal Control or rigid establishments of standards in labour legislation.

(c) Social Welfare work in factories.

Apart from a detailed appreciation of the trends elsewhere in this work, the main part of this field of study will be practical ; it might, however, be possible to develop certain definite lines of research as best suited to conditions in different industries, namely :

(i) Desirability of savings banks, consumer's co-operative societies, etc.

(ii) Necessity of State, employers' and employees' co-operation in Labour Welfare Work with a view to eliminating the notions of class differences.

(iii) Realisation of employers' difficulties.

(iv) Evils of drinking, gambling, etc.

(v) Need of educating the workers and their children.

(vi) Need of Labour Welfare Reserve Fund.

(f) Workers' and Employers' Organisation.

The Trade Union movement in the West : origins, types of unions, U. S. A. position ; the problem in India ; factual survey ; the Trade Union and employers.

(g) Social insurance and group insurance, its nature, extent and principles with special reference to industrial workers in India, including the recent developments in India and foreign countries.

### III. LAWS RELATING TO INDUSTRIES

(1) Powers of the Central and Provincial Governments in the matter of framing legislations affecting Industry and Labour, (2) Labour Legislation, (3) Principles of Law, (4) Indian Factories Act, (5) Indian Trade Unions Act, (6) Indian Trade Disputes Act, (7) Payment of Wages Act, (8) Workmen's Compensation Act, (9) The Employment of Children (Workshop) Rules, 1940, (10) Bengal Maternity Benefit Act and Maternity Benefit Rules, 1940, and such other Acts as may be hereafter passed.

### IV. STATISTICS

(1) General Introduction to Statistics and Statistical concepts, (2) Classification of Data, Tabulation, Frequency Distribution, Time Series, etc. (3) Graphic Presentation,

Diagrams and Charts, (4) Measurement of Averages, (5) Weighted Average and Index Numbers, (6) Cost of Living Index Number, (7) Statistical Enquiries : Preparation of Questionnaires, Schedules and Forms, (8) Uses of Official Statistical Publications, (9) Representative Samples in Statistical Survey, (10) Supervised Practical classes.

During the period of training as Labour Officer in the actual field the student will meet facts and phenomena which will readily admit of statistical interpretation and analysis. Such facts and phenomena exist in all sociological fields.

The primary object of this course will be to make the student more conscious of and interested in these facts, look at them as statistical data, subject them to condensation and analysis, finally utilise the precise information so obtained in the formation of general conclusion and the framing of general policies.

There will be no attempt at making this course an exhaustive statistical training, nor will it involve treatment from the angle of Pure Mathematics, *i.e.*, by means of Theory of Probability which is, however, the basis of modern Statistical Science. This course, while being limited and elementary, will be more of a practical nature than theoretical.

It will aim at making the Trainee so equipped with statistical knowledge that he will find its immediate application in his particular field of work, and with that object in view, illustrations will be profusely drawn from actual conditions of Industry in India.

## V. SOCIAL AND INDUSTRIAL PSYCHOLOGY

(a) Psychological basis of sociology. Relations of sociology to other sciences. The fundamental facts for psychological sociology, social co-ordination and social self-control. The role of instinct in social life. The role of intellect in social life. The theory of social progress. The social mind and social consciousness ; public opinion and popular will.

(b) Efficiency of workers, optimum production, fatigue, accident proneness, incentives, etc., strikes and lockouts—their effect both on employers and employees, workers' union propaganda, selection of workers, intelligence testing, etc. Organisation and Leadership ; Group Psychology, Psychology of crowd. Psychology of the mass during period of strain, management of panic, management of labour, etc. The social worker, the nature and field of his work, technique of work, etc.

## VI. PUBLIC HEALTH ADMINISTRATION

- (1) Major function of Social Organisation for Social Welfare.
- (2) Public Health as a Social Service.

- (3) Future of University Social Science seen through Public Health.
- (4) Place of Medicine in Industry.
- (5) Health Maintenance in Industry.
- (6) Health Education.
- (7) Industrial Health and need for Industrial Health Service.
- (8) Industrial Hazards with special reference to Jute Mills workers.
- (9) Control of communicable diseases in industrial communities.
- (10) Protection of women and children in Industry.
- (1) Housing for working classes, (2) Sanitation and sanitary supervision of factories : (i) Water ; (ii) Disposal of sewage and refuse ; (iii) Food sanitation ; (iv) Control of insects ; (3) Plant sanitation ; Lighting and Atmospheric control. Noise, Vibration, Safety, etc.

#### FOOD AND NUTRITION

- (1) Evolution of the science of nutrition ; Nutrition a public health problem : (i) Nutritionist in a public health policy ; (ii) Nutritional diseases for the public health worker ; (iii) Physique and Nutrition of Nations ; Nutrition propaganda and its limitations in India.
- (2) The requirements of a well-balanced diet. Indian dietary and its deficiencies : (i) Results of dietary and Nutrition surveys in India ; (ii) Methods of improvement of dietaries ; Agricultural and Economic aspects of Nutrition in India.
- (3) Prevention of Adulteration of Food.

#### VII. PRACTICAL TRAINING

Field work : investigation of conditions of work in mills, conditions of family life, welfare activities, sanitary supervision, propaganda, etc.

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## CHAPTER XXXVII-D

### DIPLOMA IN SOAP TECHNOLOGY

1. An examination for the Diploma in Soap Technology shall be held annually in Calcutta and in such other places as shall, from time to time, be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Every candidate for the Diploma shall satisfy the following conditions :—

(i) That he has passed the examination for the Degree of Bachelor of Science with Mathematics, Physics and Chemistry.

(ii) That he has completed, since passing the aforesaid examination, a regular course of lectures, both theoretical and practical, in the subjects prescribed for the examination, for one academical year, in the University Post-Graduate classes or in an Institution or Institutions affiliated to, or recognised by, the University for this purpose.

(iii) That he has attended, during the said period of one academical year a Factory or Factories recognised for the purpose, for a minimum period of two months for necessary training.

3. Every candidate sent up for the examination shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the periodical examinations of the Institution and other tests and (d) of probability of passing the examination. Every candidate shall send in his application, with a certificate in the form prescribed by the Syndicate, to the Registrar at least six weeks before the date fixed for the commencement of the examination.

4. A fee of Rs. 100 shall be forwarded by each candidate with his application. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee, but he may be admitted to one or more subsequent examinations for the Diploma in Soap Technology on payment of a like fee of Rs. 100 on each occasion, provided he produces a certificate from the Head of a recognised Soap Factory to the effect that he has undergone a course of practical training in the factory for at least two months during the year immediately preceding the examination at which he presents himself.

5. The examination shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

6. The subjects of study for the examination for the Diploma in Soap Technology shall be :—

- (i) Oils, Fats and Waxes.
- (ii) Soaps and Glycerine.
- (iii) Perfumes.
- (iv) Descriptive Engineering.
- (v) Statistics and Costing.

7. (a) The examination shall be written, oral and practical. Every candidate will be required to keep a systematic record of training obtained by him in the Factory or Factories approved for the purpose, which shall be inspected and taken into consideration at the time of practical examination.

(h) The distribution of papers and marks shall be as follows :—

*Theoretical—*

(i) Oils, Fat and Waxes	..	One paper
(ii) Soaps and Glycerine	..	One paper and a half
(iii) Perfumes	..	One half paper
(iv) Descriptive Engineering	..	One half paper
(v) Statistics and Costing	..	One half paper

*Practical—*

Paper I—Analytical	..	100 marks
Paper II—Manufacturing Operations	..	100 "
Paper III—Perfumes	..	50 "
Paper IV—Descriptive Engineering	..	50 "

<i>Oral—</i>	..	50 "
Records of Factory Training	..	50 ..

Each Theoretical paper shall be of three hours and carry 100 marks and each half paper shall be of two hours carrying 50 marks.

8. The examination shall be conducted on the lines of the syllabus to be drawn up from time to time by the Executive Committee of the Council of Post-Graduate Teaching in Science on the recommendation of the Board of Higher Studies in Applied Chemistry. The Board of Higher Studies in Applied Chemistry will recommend to the Executive Committee the paper-setters and examiners. These paper-setters and examiners will also constitute the Examination Board.

9. Candidates will be required to pass in the oral and the practical as well as in the theoretical portion of the subjects as defined in the syllabus.

10. As soon as possible after the examination the Syndicate shall publish a list of candidates who have passed, arranged in two classes, each in order of merit. Each successful candidate shall be given a certificate in the form prescribed in Appendix A.

11. In order to pass the examination a candidate must obtain 40 per cent. of the marks in each theoretical paper and 40 per cent. of the marks in the oral and practical examinations. Candidates obtaining 60 per cent. of the aggregate marks shall be placed in the First Class.

12. The candidate who is placed first in the First Class securing not less than 60 per cent. of the total marks in the theoretical papers shall receive a Gold Medal, provided he passes the examination in his first attempt as a regular student.

13. Any candidate who has failed in one subject only, and by not more than 5 per cent. of the full marks in that subject, and has shown merit by gaining 50 per cent. or more in the aggregate of the marks of the examination, shall be allowed to pass.

14. If the Examination Board is of opinion that in the case of any candidate not covered by the preceding regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Executive Committee with a definite recommendation and the reason for such recommendation. The Executive Committee may accept the recommendation or may refer the matter back to the Board for reconsideration.

15. The limits of the different subjects, both theoretical and practical, are given below. Books shall be prescribed or recommended when necessary by the Board of Higher Studies in Applied Chemistry.

### THEORETICAL COURSE

#### 1. Oils, Fats and Waxes

- (a) Sources.
- (b) Extraction and refining.
- (c) Constituents.
- (d) Chemical and physical constituents of oils, fats and waxes.
- (e) Soap making properties of different oils and fats.
- (f) Rancidity of oils—their causes and preventions.
- (g) Hydrogenation and utility of hydrogenated oils.
- (h) Sulphonated oils.
- (i) Industry of fatty acids and resin.

## 2. Soaps and Glycerine

A. Soaps—(a) Hard, (b) Soft, (c) Liquid, (d) Metallic soaps and ammonium soaps, (e) Industrial soaps, (f) Medicinal soaps, (g) Transparent soaps, (h) Soap substitutes—other detergents. Their methods of manufacture and their detailed uses.

B. Packing and storage.

C. Marketing.

D. Statistics.

E. Discussions on different phenomena of Soaps—(a) Detergencies—different theories, (b) Lathering properties, (c) Hydrolysis, (d) Rancidity—causes and prevention, (e) Sweating—theory and prevention, (f) Cracking.

F. Manufacture of Glycerine from (1) Soap lye, (2) Oils and fats by catalytic splitting and other processes, (3) Molasses by fermentation.

G. Crude glycerine—pure and commercial glycerine—their specifications and uses—methods of testing glycerines.

H. Glycerine substitutes.

## 3. Perfumes

A. Essential oils—(1) Occurrences, (2) Methods of manufacture.

B. General constitutions of Essential oils—(1) Alcohols, (2) Aldehydes, (3) Ketones, (4) Esters, (5) Phenols, (6) Terpenes, (7) Miscellaneous compounds.

C. Study of the following oils—(1) Sandalwood oil, (2) Citronella oil, (3) Lemongrass oil, (4) Cloves oil, (5) Eucalyptus oil, (6) Vetiver oil, (7) Jasmine oil, (8) Rose oil, (9) Lavender oil, (10) Bergamot oil.

D. Preparation of some important constituents of Perfumes—(1) Geraniol, (2) Geraniol esters, (3) Eugenol, (4) Vaniline, (5) Iso eugenol, (6) Citral, (7) Hydroxycitronellal, (8) Citronellal, (9) Ph. ethyl alcohol, (10) Coumarine, (11) Musk, (12) Indol.

E. Odour and constitutions.

F. Oleo Resins, (a) Source, (b) Methods of extraction, (c) Uses.

G. Blending of perfumes—(a) Soap perfumes, (b) Hair oil perfumes, (c) Handkerchief perfumes, (d) Pomades and creams.

H. Manufacture of Cosmetics—

Raw materials.

General principles of the manufacturing.

Theory of Emulsion.

Packing.

Marketing.

#### 4. Descriptive Engineering

Fuels—Calorific value. Boilers—Water treatment—properties of steam.

Power Generation—including heat engines.

Motors of different types.

Pumps.

Heat transfer—Evaporation and evaporator.

Soap machinery.

Drying and drying plants.

Extraction of oils.

Distillation.

Plant layout.

#### 5. Statistics and Costing

(1) Statistical data on the cultivation and availability of different oils, oil seeds, fats, waxes, essential oils and gum resins.

(2) Production and consumption in India and in different parts of the world.

(3) Export and import figures of India.

(4) Statistical data on the production and consumption of soaps.

(5) Calculation of costs of manufacture of different products.

(6) Factory Acts and Regulations.

### PRACTICAL COURSE

#### Oils, Fats and Waxes

(1) Chemical and physical constants of oils, fats, waxes and hydrogenated oils.

(2) Identification of oils.

(3) Detection of Adulterants in common oils and fats—

(i) Tallow, (ii) Coconut oil, (iii) Groundnut oil, (iv) Castor oil,

(v) Sesame oil, (vi) Mohua oil, (vii) Bone oil, (viii) Linseed oil.

(4) Refining of oils, fats and waxes.

#### Soaps and Glycerine

(1) Analysis of soaps.

(2) Analysis of spentlye.

(3) Analysis of nigre.

(4) Analysis of glycerine.

(5) Preparation of soaps—

(a) Cold Process soap.

(b) Transparent soap.

(c) Semi-boiled washing soap.

(d) Settled soap.

(6) Splitting of Fats and Oils for the manufacture of stearic acid, oleic acid and glycerine.

(7) Manufacture of glycerine from spentlye.

### Perfumes

I. Evaluation of the following essential oils :—(1) Lemon-grass, (2) Cloves, (3) Citronella, (4) Sandalwood oil, (5) Eucalyptus oil, (6) Vetiver, (7) Patchouly, (8) Jasmine, (9) Linaloe, (10) Palmarosa, (11) Kaora, (12) Cassia, (13) Gum benzoin, (14) Olibanum, (15) Turpentine.

II. Preparation of the following :—

A. (1) Eugenol, (2) Citral, (3) Vitverol, (4) Ceramiol, (5) Citronellol, (6) Santalol, (7) Patchilol, (8) Cinnamic aldehyde, (9) Terpeniol, (10) Bromostyrol.

B. Some simple Esters—

(1) Esters of Geraniol and Terpeniol, (2) Amyl salicylate, (3) Methyl anthranilate, (4) Ethyl cinnamate, (5) Benzyl acetate.

III. Blending of Perfumes—

Preparation of (1) Eau-de-cologne, (2) Jasmine, (3) Rose, (4) Narcissus, (5) Neroli.

IV. Identification of organic groups like carboxylic, aldehydic, hetonic, ester, etc.

V. Preparation of some important Cosmetics—(1) Creams, (2) Snows, (3) Pomades, (4) Powders, (5) Hair oils.

VI. Deodorisation of alcohol.

### Descriptive Engineering

(1) Fitting up machinery required in Soap manufacture.

(2) Boiler trial, Fuel analysis.

(3) Experiments on Drying.

(4) Evaporator trial.

(5) Distillation.

### Drawing

Simple Geometrical Drawing.

Machine parts—Steam Engine parts.

Soap machinery (assembly drawing).

Quantitative flow sheet diagrams of various industries of oils and fats.

The Laboratory note-books of candidates shall be examined and marked by Examiners. Note-books which have not been signed at frequent intervals by the professors under whom the candidates worked will not be accepted.

## CHAPTER XXXVII-E

### DIPLOMA IN JOURNALISM

1. An examination for a Diploma in Journalism shall be held annually in Calcutta on such dates as the Syndicate may determine, from time to time, on the recommendation of the Committee referred to in Section 2 below.

2. The Syndicate shall appoint a Standing Committee every two years for the purpose of selecting candidates for admission to the Diploma Course of training, and for supervising all arrangements for the execution of the scheme of training and examination under these Regulations, subject to the control of the Syndicate. The constitution of the Committee will be determined by the Syndicate from time to time.

3. Any candidate who has passed an examination for a Bachelor's degree in any Faculty of this University or of any other recognised University, or who has been accepted for admission to the Diploma Course of training by the Committee on the ground of previous experience of at least one year in the office of a recognised Newspaper, Periodical or News Agency, and has passed the Intermediate Examination of this University or of any other recognised University, may be admitted to the examination for the Diploma in Journalism, provided he has prosecuted a regular course of study for two academic years, or such shorter period as may be determined by the Syndicate, on the recommendation of the Committee, in the Journalism Section of the University, and has also undergone a course of practical training in the office of a recognised Newspaper, Periodical or News Agency.

4. Every candidate for admission to the examination shall send in his application to the Controller of Examinations with a certificate in the form prescribed by the Committee and a fee of Rs. 60 not less than three weeks before the date fixed for the commencement of the examination.

5. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of Rs. 60 on each occasion.

6. The examination shall be written and oral and shall be conducted on the lines of the syllabus that may be prescribed by the Syndicate as hereinafter provided. Examiners shall be appointed by the Syndicate on the recommendation of the Committee.

7. The written examination shall consist of six papers and the oral examination of two papers, each paper will be of 100 marks.

8. In order to pass, a candidate must obtain 40 per cent. of marks in each paper and 50 per cent. of marks in the aggregate. Candidates obtaining 60 per cent. of marks in the aggregate shall be placed in the First Class and those obtaining 50 per cent. or more in the Second Class.

9. As soon as possible after the examination the Syndicate shall publish a list of candidates who have passed arranged in two classes, both in order of merit. Each successful candidate shall receive a Diploma in such form as the Syndicate may prescribe.

10. Every candidate shall be examined in the following subjects. The limits of the course in each subject shall be defined and books shall be recommended from time to time by the Committee, subject to the approval of the Syndicate.

#### (A) Theoretical

Paper I	.. Principles and History of Journalism.
Paper II	.. The Making of a Journal.
Paper III	.. General Knowledge of Political and Socio-Economic Developments.
Paper IV	.. General Outline of Constitutional Law and Laws of the Press.

Papers V and VI .. *Any two of the following groups :—*

- (a) Literature and Art.
- (b) Scientific and Cultural Trends.
- (c) Business of Journalism.
- (d) Commercial Journalism.
- (e) Sports, stage and screen.
- (f) Art of Advertisement and Lay-out.
- (g) Editing of Monthlies and Periodicals.
- (h) Press and Publication.

#### (B) Practical

- (a) Development of the idea of news-sense-classification of news items making press-notes, etc.
- (b) Preparation of news out of postal correspondence.
- (c) Editing of telegrams.
- (d) Art of reporting and precis writing.
- (e) Proof reading.
- (f) Technicalities of arrangements of types and headlines, selection of news items, etc.
- (g) Paragraph writing and writing of special articles.



## CHAPTER XXXVIII

### DOCTOR OF SCIENCE

1. Any Master of Science of the University of Calcutta, may offer himself as a candidate for the Degree of Doctor of Science provided three years have elapsed from the time when he passed the examination.

Any Doctor of Medicine or Master of Surgery or Master of Obstetrics of the University of Calcutta may also offer himself for the Degree of Doctor of Science.

2. Every candidate shall state in his application the special subject within the purview of the Regulations for the Degree of Master of Science, or a subject allied or ancillary thereto upon a knowledge of which he rests his qualification for the Doctorate, and shall, with the application, transmit three copies, printed or type-written, of a thesis that he has composed treating scientifically some special portion of the subject so stated, embodying the result of research, or showing evidence of his own work, whether based on the discovery of new facts observed by himself or of new relations of facts observed by others or tending generally to the advancement of science. The candidate shall indicate, generally in a preface to his thesis and specially in notes, the sources from which his information is taken, the extent to which he has availed himself of the work of others, and the portions of the thesis which he claims as original ; he shall further state whether his research has been conducted independently, under advice, or in co-operation with others, and, in what respect his investigations appear to him to tend to the advancement of science.

3. Every candidate may also forward with his application three printed copies of any original contribution or contributions to the advancement of the science professed by him, or any cognate branch of science, which may have been published by him independently or conjointly, and upon which he relies in support of his candidature.

4. No application shall be entertained unless two members of the Faculty of Science or two Doctors in any Faculty of this University or of a University approved by the Syndicate from time to time shall have testified, to the satisfaction of the Syndicate, that in habits and character, the candidate is a fit and proper person for the Degree of Doctor.

5. Every candidate shall forward with his application a fee of Rs. 300. No candidate who fails to pass or present himself for examination shall be entitled to claim a refund of the fee.

6. The thesis mentioned in Regulation 2 and the original contributions, if any, mentioned in Regulation 3, shall be referred by the Syndicate to a Board of three Examiners.

7. If the thesis is approved by the Board, and, if the candidate has obtained a First Class at the examination for the Degree of Master of Science or has obtained the Degree of Doctor of Medicine or Master of Surgery or Master of Obstetrics, he shall not be required to submit to any further written examination; but he may be required by the Board, at their discretion, to appear before them to be tested orally or practically, or by both these methods, with reference to the thesis, and the special subject selected by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the oral and practical examinations, if any, and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Science, they shall cause his name to be published, with the subject of his thesis, and the titles of his published contributions (if any) to the advancement of science.

8. If the candidate is a person who has obtained a Second or a Third Class at the examination for the Degree of Master of Science, and if his thesis is approved by the Board he shall be required to submit to a written examination.

Two papers of three hours each shall be set, one upon the special subject mentioned in the application of the candidate, and the other upon the subject of the thesis. The candidate may also be required by the Board, at their discretion, to appear before them to be tested orally or practically or by both these methods, with reference to the thesis and the special subject professed by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the written examination, and also of the oral and practical examinations, if any, and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Science, they shall cause his name to be published, with the subject of his thesis, and the title of his published contributions (if any) to the advancement of Science.

9. In the case of a candidate obtaining a Second class at the examination for the Degree of Master of Science and falling under the preceding regulation, if the Board, upon an examination of his thesis and of his original contribution or contributions to the advancement of science, hold the same to be generally or specifically of such special excellence as to justify the exemption of the candidate from the written examination, he may be exempted by the Syndicate, provided that the report of the Board shall set forth the fact and the grounds of such exemption.

10. A diploma under the seal of the University and signed by the Vice-Chancellor shall be delivered at the next Convoca-

tion for conferring Degrees to each candidate who has qualified for the degree.

11. Every candidate shall be at liberty to publish his thesis, and the thesis of every successful candidate shall be published by the University, with the inscription: "Thesis approved for the Degree of Doctor of Science in the University of Calcutta."

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## CHAPTER XXXVIII-A

### CERTIFICATE IN TANNING

1. An examination for the Certificate in Tanning shall be held annually in Calcutta and such other places as shall, from time to time, be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Any under-graduate of the University may be admitted to this examination provided he has fulfilled the following conditions :—

(a) That he has passed the Intermediate Examination with Physics, Chemistry and Mathematics and preferably with Botany or Zoology or Biology as an additional subject.

(b) That he has completed, since passing the Intermediate Examination in Science, a regular course of study, both theoretical and practical, in the subjects for the examination, for three academical years in any institution affiliated to, or recognised by, the University for this purpose :

Provided that candidates who have passed the B.Sc. Examination with Chemistry may be exempted from attending lectures and practical work in Elementary Chemistry but they shall attend lectures on Tanning, their qualitative tests, classification and elementary notions of the constitution of Gallo-tannic acid.

3. Every candidate, sent up for the examination, shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the periodical examinations of the Institution and other tests and (d) of probability of passing the examination. Every candidate shall send in his application with a certificate in the form prescribed by the Syndicate to the Registrar at least six weeks before the date fixed for the commencement of the examination.

4. A fee of Rs. 50 shall be forwarded by each candidate with his application. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass or appear at the examination may be admitted to one or more subsequent examinations for the Certificate in Tanning on payment of a like fee of rupees fifty on each occasion provided he produces a certificate from the head of the Institution concerned, showing that he has prosecuted a regular course of study for one academical year in each of the subjects in which

he is to be examined during the year immediately preceding the examination at which he presents himself.

5. The examination shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

6. The subjects of the examination for Certificate in Tanning shall be :—

- (i) Principles and Methods of Leather Manufacture.
- (ii) Analytical Chemistry of Leather Manufacture.
- (iii) Statistics and Costing.
- (iv) Elementary Microscopy and Bacteriology.
- (v) Leather Trades Engineering.

7. The examination shall be written and practical.

There shall be two Theoretical papers in Principles and Methods of Leather Manufacture and in each of the other subjects mentioned in Section 6 there shall be one Theoretical paper. Excepting (iii) Statistics and Costing there shall be a Practical paper in each of the other subjects.

8. The distribution of marks in Theoretical and Practical papers are as follows :—

#### *Theoretical*

Paper I—Principles of leather manufacture	..	100	marks
Paper II—Methods of leather manufacture	..	100	„
Paper III—Analytical Chemistry of leather manufacture.	..	100	„
Paper IV—Group I—Elementary Microscopy and Bacteriology of leather manufacture.	..	50	„
Group II—Statistics and Costing	..	50	„
Paper V—Leather Trades Engineering	..	100	„
Theoretical—Total		..	500 marks

Each Theoretical paper of 100 marks and 50 marks shall be of 4 hours and 2 hours respectively.

#### *Practical*

Paper I—Leather Manufacture including 50 marks for Laboratory records	..	250	marks
Paper II—Analytical Chemistry of Leather Manufacture.	..	100	„
Paper III—Elementary Microscopy and Bacteriology.	..	50	„
Paper IV—Leather Trades Engineering	..	100	„
Practical—Total		..	500 marks

9. The examination shall be conducted on the lines of the syllabus to be drawn up from time to time by the Syndicate on the recommendation of the Board of Higher Studies in Applied Chemistry. The Paper-setters and Examiners shall also be appointed on the recommendation of the Board. The Board of Higher Studies in Applied Chemistry shall consult the heads of affiliated Institutions before submitting its recommendations regarding syllabus of studies and appointments of Paper-setters and Examiners. The Syndicate shall also appoint one Examination Board to consider the result and report the same to the Syndicate for confirmation.

10. Candidates will be required to pass in the practical as well as in the theoretical portions of the subjects as defined in the syllabus.

11. As soon as possible after the examination the Syndicate shall publish a list of the candidates who have passed, arranged in three classes, each in order of merit. Each successful candidate shall be given a Certificate in the form prescribed in Appendix A.

12. In order to pass the examination, a candidate must obtain 33 per cent. of the marks in each subject. Candidates obtaining 45 per cent. of the aggregate marks shall be placed in the Second Class and those obtaining 60 per cent. in the First Class.

13. Any candidate, who has failed in one subject only and by not more than 5 per cent. of the full marks in that subject and has shown merit by gaining 50 per cent. or more in the aggregate of the marks of the examination, shall be allowed to pass.

14. If the Examination Board is of opinion that in the case of any candidate not covered by the preceding regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reason for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

15. The limits of the different subjects for both theoretical and practical are given below and the Syndicate will have power to modify them from time to time on the recommendation of the Board of Higher Studies in Applied Chemistry. Books shall be prescribed or recommended when necessary by the Board of Higher Studies in Applied Chemistry.

(i) PRINCIPLES AND METHODS OF LEATHER MANUFACTURE

*Theoretical*

Course :—History of tanning industry. Histology and structure of hides and skins. Chemical constituents of hides

and skins, hide proteins and their chemical behaviours to acids, alkalies, enzymes and to tanning materials. Different kinds of hides and skins. Different breeds of cattle, sheep and goats in India and the characteristic differences of hides and skins obtained from them. Cure and preservation of hides and skins. Tannery waters, their chemical and bacteriological properties. Methods of softening water and water-softening plants.

*Soaking*.—Soaking of green, wet-salted, dry-salted and dry hides. Putrid soaks. Soaking agents.

*Depilation*.—Depilation by sweating and by liming. Use of sodium and arsenic sulphides in depilation. Objects of liming.

Methods of unhairing, fleshing by hand and machine. Different types of unhairing and fleshing knives and beams and of unhairing and fleshing machines. Splitting of hides and skins and different types of splitting machines. Rounding of hides. •

*Deliming*.—Objects of deliming. Chemical and fermentative methods of deliming. Characteristics of natural bates. Manufacture of artificial bates. Different commercial bates and their uses. Processes of bating, puering and drenching and the objects of each. Scudding after deliming.

*Pickling*.—Objects of pickling. Chemicals used and their effects on the pelt. Process of pickling for exporting pickled hides and skins and pickling before chrome tanning.

*Tanning*.—Object of tanning and principles underlying the conversion of raw hides and skins into leather. Different processes of tanning.

*Alum tanning or Tawing*.—Its principles and methods of manufacturing various kinds of commercial leather by the process, *e.g.*, calf kid, glove kid, white leather and alum dressing of fur skins.

*Formaldehyde tanning*.—Its principles and methods of manufacturing leather by the process.

*Oil tanning*.—Its principles and methods of making oil-tanned chamois leather. Method of making chamois leather by a combined formaldehyde and oil tannage.

*Chrome tanning*.—Principles underlying chrome tannage. Two-bath and one-bath chrome tannages, their chemistry and practical methods of carrying out. Methods of manufacturing different varieties of commercial chrome leather, *e.g.*, (1) Box and Willow sides, Box and Willow calf, (2) Glacé kid, (3) Chrome sole, (4) Chrome picking band and lace leather, (5) Chrome belting leather.

*Vegetable tanning*.—Vegetable tanning materials, their sources, tanning contents, tanning properties and principal characteristics. Grinding and extraction (*i.e.*, leaching) of tanstuffs for use in vegetable tanning. Manufacturing of tanning extracts. Manufacture and use of synthetic tanning. Manufacture of various kinds of Heavy Dressing and Light leathers by vege-

table tanning process, *e.g.*, sole, belting, harness, saddlery, ammunition boot upper, suit case and upholstery leather, morocco, book binding, shoe-lining leather, etc. Bag tanning process and methods of manufacturing half-tanned leather for export.

*Dyeing of leather.*—Vegetable and coal tar dyes, their properties and uses in leather dyeing. Mordants and strikers. Methods of dyeing leather.

*Stuffing and fat-liquoring of leather.*—Process of currying and fat-liquoring. Fats, waxes and oils used in currying and stuffing. Hand and drum stuffing. Dubbings and stuffing mixtures. Fat-liquors for chrome leather, and different methods of making them. Principles of making commercial fat-liquors.

*Drying of leather.*—Humidity of air and method of its determination and control. Different systems of leather drying.

*Finishing of leather.*—Various finishing, materials, their properties and uses, *e.g.*, egg albumin, blood albumin, mucilages, gums, resins, pigment finishes, seasons and nitrocellulose lacquers.

Manufacturing of Enamelled leather for motor car and furniture upholstery.

Manufacture of Patent leather.

Manufacture of gelatine and glue.

### *Practical*

Course :—This course will teach the students practical manufacture, on a semi-commercial scale, of a few typical varieties of leather from Indian hides and skins which are of commercial importance in India. The students will have to manufacture the following varieties of leather :—(1) Box and willow sides, (2) glacé kid, (3) chrome sheep, (4) vegetable and chrome sole leather, (5) harness leather, (6) suit case leather, (7) chrome picking band and lace leather, (8) vegetable tanned light leathers such as morocco, book binding and lining leather, (9) chamois leather of combined formaldehyde and oil tannage, (10) white leather by alum tannage, (11) half-tanned E.I. kips and (12) half-tanned goat and sheep skins.

## (ii) ANALYTICAL CHEMISTRY OF LEATHER MANUFACTURE

### *Theoretical*

Course :—This course will explain by lectures the analytical methods in use in modern leather industry for analysing different materials used in tanning and controlling the processes involved in leather manufacture. The lectures will be on the analysis of water, lime, sulphides, lime liquorss, chrome salts,



chrome liquors, vegetable tanstuffs, tanning extracts, vegetable tan liquors, soap, oils, fats, waxes and leather. pH, its application in tanning and methods of its determination will be explained.

### *Practical*

Course :—Analysis of water, lime, lime liquors, sodium sulphide, red arsenic, chrome liquors, oils, fats and waxes, soap, leather, solid tanning materials, solid and liquid tanning extracts.

pH value determination of lime, bate, vegetable and chrome tan liquors.

### (iii) STATISTICS AND COSTS

Elements of Statistics—Compilation of statistical Report and charts—classification of data—Application of Graphical Methods—Correlation simplification—Probable errors—Various Methods of costing—Process cost—Direct and Indirect expenses—Raw hide Purchase and stock Books—Process stock and output Books—Allocation of expenses and its principles—final cost—Book purchase—Issue and stock of consumable stores—Elementary Book-keeping by Double Entry principle—Preparation of Manufacturing account and/or Trading account, Profit and Loss account and Balance Sheet Reconciliation of costs with Financial Accounts.

### (iv) ELEMENTARY MICROSCOPY AND BACTERIOLOGY OF LEATHER MANUFACTURE

#### *Theoretical*

Course :—A. Microscopy. The Microscope—Description of the optical and mechanical parts.

The technique of microscopy and care of the instrument.

Technique of section cutting.—Preparation and embedding of material. Cutting, staining and mounting of sections.

(a) Examination of hair, wool, collagen fibres, principal barks, leaves, powdered myrobalans and extracts used in tanning in India.

(b) Identification of different kinds of hides and skins from the examination of their grain surface.

(c) Comparative study of the structure of different kinds of hides and skins.

(d) Finished leather, its relation between quality and structure.

(e) Defective leathers. Investigation of defects due to insect, mould and bacterial damage. Exudations on leather.

*Microscopy of manufacturing processes.*—Soaking, liming, bating, pickling, tanning and finishing.

Microphotography.

B. Bacteriology, Micro-organisms—their classification, structure, growth and reproduction. Effect of food, moisture, temperature and light.

*Bacterial metabolism.*—Chemical changes produced by them during parasitic phase, production of acids, ferments, gas, colour, etc. Putrefaction and decay. Bacterial associations.

*Bacteria and disease.*—Parasites and saprophytes, mode of entry, infection and resistance of the animal body.

Cultivation and isolation of micro-organisms.

Method of examination and study of micro-organisms, *e.g.*, Staphylococci, Streptococci, Micrococci, Bacillus Coli, Bacillus Erodiens, B. Furfuris, B. Proteus, B. Liquefaciens, Clostridium Putrificans, B. Anthracis, B. Subtilis, B. Mycodes, Acetih, Butyric and Lactic bacteria, Mycoderma, Tannica, Yeasts and Moulds, Protozoa.

Effects of Micro-Organisms in the processes of curing, soaking, depilation, bating, drenching and tanning. Damages due to micro-organisms.

Anthrax in animals and man. Anthrax in the leather trade. Sources of infection. Methods of sterilisation and treatment. Home Office Regulations.

### *Practical*

Course :—A. Microscopy. Use of microscope, section cutting, staining and mounting; Microscopical studies of hair, wool, collagen fibres, principal Indian vegetable tanning materials, process hides and skins, leather, defects of leather due to insects, moulds and bacteria.

B. Bacteriology. Morphology of bacteria. Preparation of culture media, cultivation and isolation of bacteria.

### (v) LEATHER TRADES ENGINEERING

#### *Theoretical*

Course :—The object of the course is to acquaint the students, by general descriptive lectures, with various kinds of machinery and power plants they may be brought in contact with in a modern tannery and to make them familiar with the way to construct the usual types of tannery sheds, buildings, pits, etc., as are found in India.

Construction of sheds and buildings of small and medium sized tanneries. Lay-out and construction of pits. Costs of sheds and pits. Rational laying out of machinery.

*Steam boilers.*—Different types of boilers, their various sizes, capacity and suitability for a specific purpose. Their installation and maintenance. Different classes of coal used in Bengal. Burning spent tan in boilers. Boiler compositions. Boiler feed pumps and feed water heaters.

*Steam engines.*—Principal types and sizes of steam engines. General idea of their construction, component parts and working. Their efficiency and steam consumption. Their Horse Power.

*Electric power and lighting.*—Elementary knowledge of the generation and distribution of electrical energy. Electric wiring and different types of wires used. Direct and alternating currents. Transformers. Direct current and alternating current motors. Commercial instruments and methods of measuring current, resistance, pressure, power and energy.

### *Practical*

Course :—Drawing, Dismantling of different machines, Study of different component parts and their assemblage.

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## CHAPTER XXXIX

### LICENTIATE IN TEACHING

1. An Examination for the Licentiate in Teaching shall be held annually in Calcutta\* at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any candidate may be admitted to the examination not less than one year after passing the Intermediate Examination in Arts or Science, provided he has attended a regular course of lectures on the Art and Theory of Teaching in a College or Colleges affiliated in Teaching and in addition, has undergone a course of Practical training as indicated in Rule 6 below. The Theoretical portion of the course shall consist of the following subjects :—(1) Principles of Education, (2) Methods of Teaching and School Administration, (3) History of Education, (4) English Composition.

3. There shall be a written examination in each of the subjects (1), (2), (3) and (4) and a Practical examination for testing skill in teaching. The practical Test shall consist of a lesson or lessons to be given by each candidate to a class or classes at some recognised school in Calcutta. Each candidate shall select three of the following subjects and prepare one 'Notes of a Lesson' in connection with each of them. The examiner shall decide which of the lessons prepared by the candidate shall be given by him.

- I. English.
- II. Vernacular.
- III. A Classical or a Modern Language.
- IV. History.
- V. Geography.
- VI. Mathematics.
- VII. Science or Nature Study.
- VIII. Hygiene.
- IX. Art or Manual Work.
- X. The Kindergarten System.
- XI. Methods of Teaching and Testing the Primary School subjects. Methods of Inspection.
- XII. Music.

\*The examination may also be held in such places other than Calcutta as the Syndicate may appoint from time to time.

4. There shall be one paper in (1), two papers in (2), one paper in (3) and one paper in (4). Each paper shall be of three hours' duration, and shall carry 100 marks. 300 marks shall be allotted to the Practical examination. In order to pass, a candidate must obtain 40 per cent. in each of the subjects (1), (2), (3) and (4), and also in the Practical examination; and candidates obtaining at least 60 per cent. of the total marks shall be declared to have obtained a First Class and candidates obtaining between 40 per cent. and 60 per cent. of the total marks shall be declared to have obtained a Second Class. The list of both classes of successful candidates shall be published in order of merit. Letters shall be affixed to the names of candidates who obtain 80 per cent. in any of the special subjects or in Practical teaching.

Provided that the candidates who pass the Theoretical and Practical portions of the examination separately under Section 7 shall be declared to have passed the examination when they have passed in both portions of the examination. Their names shall be published separately, arranged in alphabetical order, and shall not be included in the list of candidates whose names are published in order of merit in Classes I and II.

A fee of Rs. 30 shall be payable by every candidate. If the candidate fails to pass or to present himself at the examination, he shall not be entitled to claim a refund of the fee.

5. The limits of the different subjects shall be as follows :—

### *I. Principles of Education*

The meaning of Education. The aim of Psychology. The relation of Psychology to Education.

Description of the nervous system and its functions. Sensation, perception and conception. Memory and imagination. Interest and attention. Relation of language to thought. The formation of clear and connected ideas. Fatigue and boredom. The mental development of the child and the adolescent.

Instincts and their relation to children's interests. Feeling and its expression; emotions and sentiment; pleasure and pain.

The forms of activity and of expression. The function of play. Suggestion, limitation and habit. Development of will, conduct and character.

The application of Psychology to the teaching of the school subjects.

### *II. Methods of Teaching and School Administration*

The general principles and methods of teaching and their application to the subjects included in the curriculum of secondary schools.

Functions and characteristics of a good school, order and discipline. Free discipline, authority and influence of the teacher. Punishments and rewards. Relation of guardians and teachers. Qualifications and duties of the staff. The specialist and the class master. The problem of individual differences.

Classes and classification of pupils. The curriculum and the time-table. Practice exercise. Tests, Marks, School and public examinations. Promotions. The school library. Home work and private tuition. The school furniture and apparatus. The museum, school gardens. The school office and records.

The hostel and its management.

### *III. History of Education*

(i) Modern developments in education in Great Britain.

(ii) Education in Modern India with special reference to Bengal.

### *IV. English Composition including Translation, Essay-writing, etc.*

6. Practical skill in teaching—Systematic provision shall be made for enabling students to see lessons being given by teachers of special competence and experience. Criticism lessons shall be conducted with small groups of students.

Each student shall give a number of lessons in approved schools under supervision. The number of lessons may be decided by the Principal of the College but may in no case be less than 40. The greater part of this practice should be of a continuous nature. 40 per cent. of the marks for the Practical examination shall be allotted by the Principal of the College for these practice lessons given during the course. All lesson note-books shall be available for the examiners.

7. A candidate may present himself for the Theoretical and Practical portions of the examination separately, provided that the interval between the two does not exceed two years. If the interval exceeds two years, both the Theoretical and Practical portions of the examination shall be taken together.

8. Books shall be prescribed from time to time by the Syndicate on the recommendation of the Board of Studies in Teaching.

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## CHAPTER XL

### BACHELOR OF TEACHING

1. An examination for the Degree of Bachelor of Teaching shall be held annually in Calcutta and at such other places as shall from time to time be appointed by the Syndicate, and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any candidate may be admitted to the examination provided that, after passing the B.A., B.Com. or B.Sc. Examination, he has prosecuted for not less than one academical year a regular course of study in the subjects offered by him, in one or more colleges affiliated to the University for this purpose, and has, in addition, undergone a course of Practical training as indicated in Section 10 below.

3. Candidates satisfying the requirements of any of the following sub-sections may be admitted to the examination without compliance with the conditions laid down in Section 2; such candidates shall be treated as non-collegiate students:—

(a) Any candidate who has passed the examination for the Licentiate in Teaching and has either graduated in Arts or in Commerce or in Science or served as a teacher in a recognised school for at least seven years.

(b) Any graduate teacher in a recognised school, who after passing the University Teachers' Training Certificate Examination has served as a teacher for at least two years, provided that (i) he has graduated with Honours or passed the B.Com. Examination in the First Class or (ii) he has obtained the degree of M.A. or M.Sc. in the First or in the Second Class, or (iii) he has passed the University Teachers' Training Certificate Examination with Distinction or (iv) the school in which he serves is specially approved under Chapter XL-D.

Notwithstanding anything contained above special permission may be granted to graduate teachers in recognised schools, who have passed the University Teachers' Training Certificate Examination previous to June, 1939, to appear at the examination for the Degree of Bachelor of Teaching as non-collegiate students provided that such special permission shall not extend beyond the B.T. Examination in 1942.

4. Every candidate for the B.T. Examination shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate, at least six weeks before the date fixed for the commencement of the examination.

Every candidate sent up for the examination by an affiliated college shall in addition produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the College periodical examinations and other Tests and (d) of probability of passing the examination.

5. A fee of Rs. 40 shall be forwarded by each candidate with his application.

A candidate who fails to pass or to present himself for examination shall not be entitled to claim a refund of the fee; but such a candidate may be admitted to one or more subsequent examinations for the degree of Bachelor of Teaching on payment of a like fee of Rs. 40.

5A. If a student, after completion of a regular course of study for the examination under Section 2 of the Regulations does not register himself as a candidate for or present himself at the examination or fails to pass the examination immediately succeeding such completion, he may appear at any of the two examinations immediately succeeding the examination following the completion of his regular course of study on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of his College at which he last studied or from a member of the Senate testifying to his good character during the intervening period.

If such a student does not register himself as a candidate for or appear at any of the two examinations immediately succeeding the examination following the completion of his regular course of study or fails to pass these examinations he may appear at the subsequent examinations of the same standard on payment of the prescribed fee provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes a fresh course of study for six months and undergoes necessary Practical training as indicated in Section 10 below, immediately preceding the examination at which he presents himself, such a student will be deemed as a non-collegiate student.

Provided further, that if a candidate appearing at the examination as a teacher under Section 3, does not appear at the examination after registering himself for the same or fails to pass the examination he may appear at any subsequent examination within a period of three years from the date of his examination on payment of the prescribed fee, provided he produces in addition to the ordinary certificate or certificates as required by the Regulation, a certificate from the Head of the Institution under which he has been serving testifying that he has been continuing as a teacher since he registered for or appeared at the last examination.



6. The written examination for the degree of Bachelor of Teaching shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

7. Every candidate shall be examined in the following subjects :—

- (1) Principles of Education including Educational Psychology. .. *Two Papers*
- (2) History of Education .. *One Paper*
- (3) General Methods, School Organisation and School Hygiene. .. *One Paper*
- (4) Contents and Methods of teaching any three school subjects from the following list, Geography being considered as equivalent to two subjects :— .. *Three Half Papers.*
  - (i) English.
  - (ii) A Classical Language.
  - (iii) A Modern Indian Language : Bengali or Hindi or Urdu or Assamese.
  - (iv) A Modern European Language : French or German.
  - (v) History.
  - (vi) Mathematics.
  - (vii) Geography.
  - (viii) Hygiene.
  - (ix) Music.
  - (x) Arts and Crafts.
  - (xi) Physical Sciences (Physics, Chemistry and Astronomy).
  - (xii) Biological Sciences (Botany, Zoology, Physiology) and Geology.
  - (xiii) Primary and Infant School Subjects.

The Syndicate shall have power to modify or add to the above list on the recommendation of the Board of Studies in Teaching.

- (5) Essay and Composition in one of the Modern Indian Languages (Bengali or Hindi or Urdu or Assamese), or in English in the case of those whose mother tongue is not one of the above four languages. .. *One Paper.*
- (6) A candidate may, if he so desire, be also examined in one of the following additional subjects :— .. *One Paper.*
  - (i) Mental and Educational Measurements.
  - (ii) Social and Abnormal Psychology applied to Education.
  - (iii) Mental Hygiene and Child Guidance.

- (iv) Methods and Organisation in Nursery Schools, Kindergartens and Montessori Schools.
- (v) Comparative Education with reference to selected countries in Europe and America.
- (vi) Education of Handicapped Children with reference to some Selected Types.

The Syndicate shall have power to modify or add to the above list on the recommendation of the Board of Studies in Teaching.

8. There shall be a written examination in each of the subjects (1) to (5) and in the additional subject, if any. There shall also be a Practical examination for testing the candidate's skill in teaching, and also his skill in Laboratory work in the case of a candidate who offers Geography or Science.

9. Each Theoretical paper shall be of three hours and shall carry 100 marks. Each half paper shall be of two hours and shall carry 50 marks.

250 marks shall be allotted for the Practical examination as follows :—

(a) For candidates taking up Science or Geography—

(i) One lesson to be given to a class (on any one of the subjects taken up by the candidate).	..	100 marks
(ii) Practical Examination in Laboratory	..	100 marks
* (iii) Lesson Notes, Laboratory Note-Books, etc.	..	50 marks

Total .. 250 marks

(b) For candidates not taking up Science and Geography—

(i) Two lessons to be given to a class or classes (on any two of the subjects taken up by the candidate).	..	200 marks
* (ii) Lesson Notes, Tutorial work, etc.	..	50 marks

Total .. 250 marks

\*On the recommendation of the Board of Studies in Teaching the following distribution of marks in (iii) Lesson Notes, Laboratory Note-Books, etc. in (a) and in (ii) Lesson Notes, Tutorial work, etc. in (b) was adopted by the Syndicate :—

*For candidates taking up Science or Geography—*

Laboratory Notes	..	20 marks.
Lesson Notes	..	10 marks.
Tutorial work	..	10 marks.
Practice Teaching	..	10 marks.

*For candidates not taking up Science or Geography—*

Lesson Notes	..	10 marks.
Tutorial work	..	20 marks.
Practice Teaching	..	20 marks.

10. Colleges, affiliated to the B.T. standard shall make systematic provision for enabling the students to see lessons being given by teachers of special competence and experience. Criticism lessons shall be conducted with small groups of students.

Each student shall give a number of lessons in the subjects taken by him under Section 7(4) in selected schools under supervision. The number of lessons may be decided by the Principals of the Colleges but shall in no case be less than 30.

All lesson-notes shall be available to the examiners at the time of the Practical examination.

11. Candidates intending to appear at the B.T. Examination under Section 3(a) shall be required to prepare notes for 40 lessons on subjects taken by him under Section 7(4). Such lesson-notes shall be available to the examiners at the time of the Practical examination.

Candidates intending to appear at the examination under Section 3(b) shall also be required to keep a record of at least 40 lessons delivered in their schools after they have passed the University Teachers' Training Certificate Examination. This record shall be inspected and taken into consideration at the time of the Practical examination.

12. The practical test in teaching shall consist of a lesson or lessons to be given by each candidate to a class or classes at some recognised school.

Candidates will be required to prepare, for presentation to the examiners at least a week before the examination, full teaching notes of three lessons, *e.g.*, one lesson for each of the subjects taken up under Section 7(4). The notes should indicate (a) the age of the pupils for whom the lesson is intended, (b) the previous knowledge which they are assumed to possess, and (c) the diagrams, maps, apparatus and other illustrations which it is proposed to use. The examiners shall decide which of the lessons prepared by the candidate shall be given.

The examiners may require a candidate to give an extra lesson if, in their judgment, such a lesson is necessary.

13. A candidate may present himself for the theoretical and the practical portions of the examination separately, provided that the interval between the two does not exceed two years. If the interval exceeds two years, both the theoretical and the practical portions of the examination shall be taken together.

14. In order to pass, a candidate must obtain 40 per cent. of the marks in each of the compulsory subjects and 40 per cent. of the marks in the practical examination.

If a candidate has passed in the compulsory subjects and in the practical examination, the marks in excess of 40 obtained by him in the additional subject, if any, shall be added to his

aggregate and the aggregate so obtained shall determine his class and his place in the list.

Candidates obtaining at least 540 marks shall be declared to have obtained a First Class and those obtaining 360 marks shall be declared to have obtained a Second Class.

Letters shall be affixed to the names of candidates who obtain 80 per cent. of the marks in any subject or in the practical examination.

The candidate who is placed first in the First Class shall be entitled to a prize of books of the value of Rs. 100.

15. As soon as possible after the examination the Syndicate shall publish a list of successful candidates arranged in two classes, both in order of merit :

Provided that candidates who pass the theoretical and the practical portions of the examination separately under Section 14, shall be declared to have passed the examination when they have passed in both portions of the examination. Their names shall be published separately, arranged in alphabetical order, and shall not be included in the class lists arranged in order of merit.

16. The limits of the different subjects shall be as indicated below. Books shall be prescribed from time to time by the Syndicate on the recommendation of the Board of Studies in Teaching to indicate the standard and extent of knowledge required in the different subjects.

## PRINCIPLES OF EDUCATION INCLUDING EDUCATIONAL PSYCHOLOGY

### *Paper I*

Concept of education. Educational aims from the point of view of the individual and of society.

Influences of heredity and environment on the mental development of children.

Development of the school idea. Main types of schools and their distinctive functions.

The teacher and his functions.

The curriculum and the principles of curriculum construction.

Mental characteristics of human beings and their development. Chief stages in general development.

A brief review of modern trends in educational theory and practice.

### *Paper II*

Physical basis of mental life.

The general bearing of Psychology upon the theoretical and practical problems of education.

The psychology of individual differences. Intelligence, its nature, measurement and distribution. Instinct. Emotion. Temperament and Character. Preception. Memory. Imagination.

The psychology of the learning process. Acquisition of skill, knowledge and taste. Formation of habits.

Nature and growth of mental functions involved in the learning process. Interest and Attention. Laws of learning.

Measurement of learning. Examination. Scholastic tests.

Development of emotions and sentiments; basis of character training.

Psychology of the adolescent.

Educational bearing of the psychology of the unconscious.

Discipline.

Psychology of teaching methods and school subjects.

### HISTORY OF EDUCATION

A brief review of the Hindu, Buddhistic and Islamic systems of education in India.

Contributions of Rousseau, Pestalozzi, Froebel, Herbart, Montessori and Dewey to modern educational thought.

A general survey of the development of elementary, secondary and higher education in Great Britain from 1830 to the present day.

Early beginnings of Western education in India. Macaulay's Minute.

Development of Western education in India. Important educational despatches.

Promotion of education through local self-governing bodies, Primary Education Acts in India. An outline survey of the development of elementary education in India.

Present position of secondary education (with special reference to Bengal and Assam).

Indian Universities' Act and the growth of Indian Universities. Calcutta University Commission. Later development of the Universities with special reference to Calcutta University; its organisation, administration and problems.

Development of women's education in India.

A brief review of the national education movement and educational experiments in India.

### GENERAL METHODS, SCHOOL ORGANISATION AND SCHOOL HYGIENE

School building and equipment. The laboratory and the library.

The teacher; his academic and professional preparation. Selection of teachers.

General organisation. The curriculum and the time-table.  
Class room administration. Supervision.

Methods of individualised instruction. Project method.

The technique of instruction; Planning a lesson.

Exposition and illustrations in teaching. Teaching aids and appliances. Visual instruction. Correlation of studies.

Self-government in schools. Training in citizenship.

Extra-curricular activities. Games and Recreation.

Examinations and Tests. Pupil progress and promotion.  
Measurement of teaching efficiency.

Health of school children. Personal and school hygiene.  
Medical Inspection.

School sanitation.

Conditions of healthy physical life and development of children at home and at school. Tiffin in schools.

Functions and responsibilities of teachers with reference to health and disease.

## CONTENTS AND METHODS OF TEACHING SCHOOL SUBJECTS

*(Three subjects are to be selected, Geography being considered as equivalent to two subjects)*

Detailed study of the contents and methods of teaching three of the following subjects with special reference to High Schools :—

(i) English, (ii) a Classical Language, (iii) a Major Modern Indian Language (Bengali or Hindi or Urdu or Assamese), (iv) a Modern European Language (French or German), (v) History, (vi) Mathematics, (vii) Geography, (viii) Hygiene, (ix) Music, (x) Arts and Crafts, (xi) Physical Sciences (Physics, Chemistry and Astronomy), (xii) Biological Sciences (Botany, Zoology, Physiology and Geology), and (xiii) Primary and Infant School Subjects.

The Syndicate shall, on the recommendation of the Board of Studies in Teaching, indicate from time to time the scope of the different subjects enumerated above.

## (I) CONTENTS

Candidates will be expected to show an adequate knowledge of the syllabuses and the subject matter taught in school up to the Matriculation standard in the subjects selected by the candidates under Section 7(4).

## (II) METHODS OF TEACHING

The syllabuses for the methods of teaching school subjects will be on the following lines :—

*English*

The place of English in the education of Indian Children. Aims of teaching English in India. English and the mother-tongue. The problem of Bilingualism.

Psychology of teaching English. Common difficulties in teaching the language. Various methods of teaching; Basic English, Direct Method. West's New Method, Palmer's Method and other methods; their advantages and disadvantages.

Oral method of teaching. Spoken English. Local speech habits and their influence. Peculiar difficulties of Indian children.

Necessity of training in Phonetics for language teachers. Organs of Speech. Analysis and Classification of Sounds. The International Phonetic Association Alphabet.

Reading—Silent and Loud Reading. Qualities of good Reading. Reading in the Class. Intensive and Extensive Reading. Rapid Reading Books and their use. The use of the Class Reader.

Teaching of Poetry. Aims. Methods.

Spelling difficulties. The Use and Abuse of Dictation. Punctuation.

Grammar, its place in the curriculum. Old and new methods of teaching grammar.

Composition—Oral and Written. The use of Models and Pictures in Composition. Essay writing.

The place of Translation in teaching languages.

Handwriting. Marks of good Handwriting. Different Styles. The advantages of Script Writing.

*A Modern Indian Language**(Bengali)*

Importance of the mother-tongue in education. Aims of teaching the mother-tongue.

Bengali: Spoken and written. The influence of local dialects on speech habits. The importance of the study of phonetics for language teachers.

Reading. Silent and Loud Reading.

Teaching of Poetry. Bengali Metre and Prosody.

Teaching of Prose. Types of Prose Reading. Stories and Essays.

Bengali Grammar: Its characteristics. The old and the new methods of teaching grammar.

Errors in spelling and their causes. Study of words.

Bengali punctuation.

Study of Bengali rhetoric.

**Translation :** its place in the curriculum. Method of teaching translation from English to Bengali.

**Sentences and paragraphs :** their integrity and inter-connection. Method of teaching by different examples.

**Composition and Essay-writing.** Combination of oral and written work.

Stages in the learning of Bengali.

The above syllabus will be used with necessary changes for Assamese, Hindi and Urdu.

### *Mathematics*

**Aims of teaching Mathematics in schools.** Different methods in teaching Mathematics—Synthetic and Analytic, Inductive and Deductive.

**Arithmetic :** Concept of Number. The First Four Rules. Fraction and Proportion, Decimal Fraction. Solution of Problems. The connection between Algebra and Arithmetic. Purposes of teaching Arithmetic. Abstract and Concrete Arithmetic. Methods of teaching Arithmetic.

**Algebra :** Scope and Definition. Directed numbers and Fundamental Operations. Symbolism. Fundamental Laws. Formulae. Factorisation. Equation. Irrational Numbers, Algebraical Problems. Importance of Graph.

**Geometry.** Elementary Concepts. Simple Practical Exercise in early stages. Synthetic and Analytic Methods of Demonstration. Methods of attacking Geometrical Problems and Constructions.

**Algebra in Geometry.** Origin and Development of Geometry. Euclidean and Non-Euclidean Geometry.

**Numerical Trigonometry.** Measurement of Angles.

**Trigonometrical Ratios.** Heights and Distances. Elements of Surveying.

**Teaching of Mensuration and Mechanics.**

Practical work and use of appliances in connection with the teaching of Mathematics.

### *History*

**The place of History in Education.** The aims of History instruction.

Early conception of History ; Scientific conception ; Modern conceptions.

**The Scope of History,** Race, Environment ; Language ; Arts ; Religion ; Society ; Public Institutions, Attainments in Science.

Steps in History teaching.

The problem of grading History ; The practice in Bengal as compared to the practice in other countries. Syllabus of



History in other countries ; History in our School curriculum ; Our special difficulties.

The biographical approach to History ; Principles of selection. The study of social groups.

Concrete illustration. How to make History real. Historical Museums. Excursions, Charts, Models, Portraits, Plans ; the idea of Chronology—; Time Scale, Maps, Diagrams and other special devices. Dramatised History ; History teaching by dialogues—Visualisation.

The Historical method ; Sources ; Documents as atmosphere, Documents as exercise.

Text-books on History ; how to use them.

History and allied studies ; Collateral Reading ; How to use the library.

Correlation of History with other subjects. Geographical background of History.

The History examination ; general conception ; School Examinations in different countries ; what history examination should aim at.

Specimen Lessons. Selected topics on Ancient, Mediaeval and Modern periods of Indian History and of English History.

### *Primary and Infant School Subjects*

Primary curriculum. Its basic objectives.

3 R's, their place in the Primary curriculum.

Basic principles of teaching young children. Importance of habit formations.

Reading. Different methods of teaching Primary reading, Alphabet, Phonetic, Word and Sentence Methods. Stories and Story-telling.

Silent reading.

Oral Composition. Formation of language habits. Written composition.

Nursery Rhymes and their value. The necessity of teaching poetry.

Rhythm and rhythmic exercises.

Handwriting. Primary exercises and different systems.

Arithmetic ; Concept of Numbers and manipulation. Teaching of Four Simple Rules. Ideas of Fraction and Quantitative Measures. Introduction of the Decimal system. Problems involving four simple rules. *Subhankari* and Mental Arithmetic.

History and Geography in the Primary School.

Nature Study. Drawing and Handicrafts ; Their Importance and Use.

Use of Activities, Games and Appliances in teaching young children.

Kindergarten. Montessori, Decroly, Project and other methods.

Use of Tests in Primary schools.

*Geography**(Theoretical)*

## FIRST HALF

*The Physical Basis of Geography* .. .. 80 marks

Shape and size of the earth. Latitude and Longitude. The movements of the earth and the resulting diurnal and seasonal changes. The crust of the earth—igneous, sedimentary and metamorphic rocks. Processes of weathering types of land forms—Plains, Plateaus, Mountains, Valleys. Lakes and their characteristics. Rivers, Glaciers and Winds, as agents of transportation, corrosion and deposition. Types of coasts and coastal erosion. Volcanoes and earthquakes.

Elements of Climate—temperature, pressure and wind, rainfall. Factors of climate. Types of climate.

Movements of Oceanic waters—tides and currents.

*Method of Teaching Geography* .. .. 20 marks

The Geography room and its equipment. Methods of teaching physical basis of geography. Illustrative material in physical geography. Map work Modelling.

## SECOND HALF

*Human, Regional and Economic Geography* .. 30 marks

Natural regions of the world on the basis of relief, climate and vegetation. Modes of life and means of sustenance in typical areas of the world. The outlines of the geography of the continents: Surface relief, climatic conditions, river systems, vegetation and animal life, agriculture, industry and commerce, ports and inland towns, political divisions.

Principles of Commercial Geography—Agriculture and Mining; Industries; Transport facilities; Ports and Trade centres.

Geography of India and any two of the following countries to be treated in some detail:—

				Great Britain
				France
Europe	..	..	{	Germany
				Italy
Eurasia	..	..		U. S. S. R.
Asia	..	..	{	China
				Japan
North America	..	..	{	U. S. A.
				Canada
South America	..	..	{	Brazil
				Argentina

(The two countries are to be prescribed from time to time by the Board of Studies in Teaching.)

*Method of Teaching Geography* .. .. 20 marks

Methods of teaching human, regional and economic geography. Illustrative material in teaching human, regional and economic geography. Correlation with other subjects. Value of local study in geography teaching. Use of statistics in school geography.

*(Practical)*

Simple meteorological observations ; maximum and minimum thermometer ; dry and wet bulb thermometer ; barometer ; rain gauge ; Plotting of meteorological data.

Map projection Drawing of maps on cylindrical, conical and zenithal projections by graphical method.

Conventional signs used in survey maps ; interpretation of topographical maps of typical areas of India.

Drawing and interpretation of climatological and economic maps.

Identification of rocks (Granite, Basalt, Sand-stone, Limestone) and cereals and fibres.

Chain surveying and Plotting of data to scale.

*Physical Sciences**(I. Physics, II. Chemistry and III. Astronomy)*

*Methods of teaching Science* (for Physical Sciences as well as Biological Sciences and Geology).

(a) Aims of Science Teaching.

(b) Claims of Elementary Science to a place in the curriculum of secondary schools—purpose and construction of the syllabus—interpretation of the syllabus and the teaching of individual subjects—general nature of the teaching of Science.

(c) Detailed study of the various methods—Practical and Theoretical—Method of Investigation—Heuristic Method ; History of Discovery—Herbartian method applied to Science Teaching—Deductive and Inductive methods—the ‘ Sequence ’ and ‘ Forms ’ of instruction—the Logical and Psychological Sequences—Analysis and Synthesis—Generalisation—Preparation of notes of lessons.

(d) Habit and Skill in Science Teaching—Instruction aiming at Skill—Intellectual control of data—Note-books—Diagrams and lesson notes—Text-books—Reference for further reading.

*Contents**(i) PHYSICS**(Theoretical)*

The three states of matter ; Solids and Fluids ; Liquids and Gases.

Physical properties of Air ; Physical properties of Water ; Buoyancy ; Archimedes' Principle ; Specific Gravity ; Determination of Specific Gravity ; Pressure of Air ; Barometer.

Effect of heat on Water ; Effect of heat on Air ; Ventilation ; Wind.

Effect of heat on solid bodies ; Pendulum Clock ; Thermometer—Maximum and Minimum Thermometer, Clinical Thermometer.

Transference of heat ; Conduction ; Convection ; Radiation ; Simple ideas regarding energy ; Potential Energy ; Kinetic Energy ; Transformation of Energy.

Rectilinear propagation of lights ; Shadows ; Eclipse of the sun and the moon.

Laws of reflection ; laws of refraction ; prism ; lens ; colours ; spectrum colours ; Newton's disc ; colours of bodies ; rainbow.

Lodestone ; artificial magnets ; soft iron and steel ; polarity ; magnetic needle ; terrestrial magnetism ; ships' compass ; lines of force due to a magnet.

Simple electric cell, effects of current—(a) heating, (b) lighting, (c) chemical, (d) magnetic.

Electromagnet, electric cell, telegraph.

*(Practical)*

Weighing by oscillation methods.

Verification of Archimedes' principle ; determination of specific gravity of solids and liquids by different methods.

Barometer reading with correction pendulum.

Fixed points of thermometer ; determination of co-efficient of linear expansion of a solid.

Verification of laws of reflection ; verification of laws of refraction ; production of pure spectrum ; magic lantern.

Preparation of artificial magnets ; determination of poles ; drawing of lines of force.

Preparation of simple voltaic cell ; electric bell, telegraph, electrolysis ; electromagnet.

(ii) CHEMISTRY

*(Theoretical)*

1. Homogeneous and heterogeneous systems ; mechanical mixture ; emulsions ; suspension ; solutions ; chemical compounds.

2. Characteristics of chemical change ; combustion ; fire and the flame of a fire.

3. Common laboratory processes ; filtration ; distillation ; sublimation ; crystallisation.

4. Pneumatics : pneumatic trough ; beehive shelf ; gas jars and covers ; collection of dry gases over mercury and mercury trough.

5. Air ; its composition ; part played by the constituents in maintaining life on earth ; artificial fixation of atmospheric nitrogen.

6. Limestone ; quick-lime and slaked lime ; hard water and soft water.

7. Preparation and properties of the common gases ; Oxygen, Nitrogen, Hydrogen and Carbon Dioxide.

*(Practical)*

1. Emulsion of cocoanut oil and water : Curdling of milk and acids.

2. Bunsen flame ; candle flame ; action of heat on (1) sodium hypophosphite, (2) sodium thiosulphate, (3) ammonium dichromate.

3. Separation of (1) alum and sand, (2) camphor and sand. Preparation of distilled water (Liebig's condenser) ; Purification of copper sulphate ; Suspended crystallisation of lead acetate and sodium thiosulphate.

4. Collection of dry ammonia over mercury and of hydrogen, oxygen over water ; of carbon dioxide by displacement of air.

5. Ventilation of  $\text{CO}_2$  from a chimney surrounding a candle flame ; combustion of phosphorus under a bell-jar over water ; rusting of iron.

6. Action of water on quick-lime and of carbon dioxide on lime-water.

Preparation and collection of oxygen and separation of  $\text{MnO}_2$  from potassium chloride.

*(iii) ASTRONOMY*

Apparent motion of the heavens—horizon—celestial sphere—Pole star—Polar axis—circumpolar stars. Apparent motion of the Sun, the Moon and the planets.

Model of the celestial globe and its uses—circles of the celestial sphere—meridian, equator, ecliptic, the signs of the Zodiac, the first point of Aries.

Path of the sun across the celestial sphere—position of sunrise on the horizon—how it varies throughout the year.

Altitude of the pole star is the latitude of the observer.

Well-known constellations—peculiarities with regard to some of them.

Planetary system—the sun and the other members of the solar system—satellites of planets—superior and inferior planets and their phases rotation between the mean distance and the periodic time of the planets—determination of their apparent positions in the sky.

The Sun—dimensions—physical state—photosphere—chromosphere—prominences—sunspots—twilight—solar year—Bengali year and the month—Calendar—Julian and Gregorian corrections.

Lengths of day and night varying during the year and at different places—seasons.

The Moon—dimensions—distance—apparent motion—phases—27 divisions of the ecliptic—lunar year and month—importance in connection with the date of festivals—*Malamasha*.

Eclipses—Solar and lunar, how they are caused—different kinds of eclipses—why eclipses do not occur at every full moon and new moon.

Comets and meteors.

Time—unit for the measurement of time—different kinds of time—Sidereal, solar, mean solar and local time—Equation of time—Sun-dial.

Nebular hypothesis—Nebulae, Milky way, star culsters—different kinds of stars—spectroscopic study of stars.

## BIOLOGICAL SCIENCES (I. BOTANY, II. ZOOLOGY AND III. PHYSIOLOGY) AND GEOLOGY

### (i) BOTANY

#### (Theoretical)

General—Life and living beings, plants and animals, Biology and Botany; Outline classification of plants; a general acquaintance with an alga, a fungus, a moss, fern, gymnosperm, a monocotyledon and a dicotyledon; different branches of Botany.

Morphology—Study of the different members of a flowering plant, such as, roots, stem, buds, branching, leaf, arrangement of leaves on stem and branches, inflorescence, flower, pollination and fertilization, fruit and seed, dispersal of seed.

Histology—The cell and its structure; living and non-living contents of a cell; simple consideration of the structure of a typical stem, leaf and root.

Physiology—Physiology of nutrition including food materials, their sources, their absorption, transport through root and stem, transpiration, photo-synthesis, storage and digestion of food material; growth, respiration, irritability and reproduction.

Consideration of the principal and subsidiary functions of stem, leaf and root, flower, fruit and seed in a very simple way. Adaptation to environment; self-protection.

*(Practical)*

Examination and drawing of parts of a complete plant, structure of a few typical seeds ; examination of normal, adventitious and modified root normal and modified stems, simple and compound leaves, their arrangement on stems and branches, their venation and a few important modifications.

Observation and drawing of a few commonly occurring types of inflorescence, typical bisexual and unisexual flowers and their parts, and a few typical fruits of Bengal.

Examination of a cell, movements of protoplasm, micro-chemical tests of starch, protein, fats and oils ; structure of stem, leaf and not in transverse sections.

Demonstration of the following simple physiological experiments : Osmosis in egg, potato osmoscope, passage of water in stem, presence of starch in green leaves, evolution of oxygen during photo-synthesis, solar and absorption spectrum of chlorophyll solution, transpiration, respiration, effects of gravity, sunlight and water on stem and root.

*(ii) ZOOLOGY**(Theoretical)*

Characteristic of the living matter. Difference between living and non-living. Difference between animal and plant.

The general morphology of the cell. Cells : Animal and Vegetable. Characteristic of Protoplasm. Cell division. Tissues ; Organs.

Division of Zoology into different branches.

Classification of the animal kingdom. Chief characteristics of each Phylum with examples. Difference between Vertebrata and Invertebrata.

Bionomics, structure and life-history of an Indian Earth-worm. *Pheretima*.

The general characters and broad classification of insects.

The structure and life-history of social insects, *e.g.*, ants and honey-bee.

The structure and life-history of mosquitoes. Devices to combat malarial disease.

The general characters of Lepidoptera (moths and butterflies). Difference between a moth and a butterfly. The structure and life-history of silk-moth.

The structure and life-history of a spider.

The general characters of Chordata.

Elementary study of Rohu.

Different kinds of Fishes. Accessory air-breathing organs in fishes.

The general character of Amphibia. Life-history of Toad or Frog.

Interdependence of plants and animals.

Adaptation to environments.

(*Practical*)

Microscopical study of unicellular animals.

Demonstration of the general characters of animals belonging to different phyla.

Dissection of the respiratory and alimentary systems of the Earthworm.

Microscopical examination of the transverse section of the Earthworm.

Dissection of the circulatory, respiratory and alimentary systems of Rohu.

Demonstration of the general visceral organs of Toad.

### (iii) PHYSIOLOGY

(*Theoretical*)

*Introduction : Definition and aim of Physiology—*

Characteristics of life :

Birth.

Growth—assimilation—anabolism.

Vital reactions—adaptation to environment—out of energy—catabolism—oxidation.

Reproduction.

Death.

*Physical Basis of Life—*

The animal cell—comparison with vegetable cell.

Growth of the multi-cellular animal from a single cell.

Elementary tissues—organs—systems.

Simple anatomical consideration of the different systems, specially—the circulatory, the respiratory, the digestive, and the osseous system (the human skeleton).

*Chemical Basis of Life—*

Chemistry of Protoplasm—the elementary constituents—the proximate constituents, *e.g.*, Organic proximate constituents—the structure-producing proteins and lipides—the energy-producing carbohydrates and lipides.

Inorganic proximate constituent—water and inorganic salts.

*Food—*

Uses of Food. Making up of standard Dietary, *i.e.*, Principle of determination of total daily requirement of food as a whole



and of the individual items, *e.g.*, proteins, lipides, carbohydrates, water and various inorganic salts.

Importance of vitamins.

*Physiology of the Digestive System—*

General structural consideration of the digestive system. Glands—their structure and functions; the nature and actions of Ferments.

Digestion in the mouth, the stomach and in the small intestines; Functions of Liver and Bile.

Absorption and fate of various foodstuffs.

Movement of food. Functions of large intestines.

*Physiology of the Circulatory System—*

General consideration of blood—the formed elements—plasma and their functions.

Structure and function of Heart—the Cardiac Cycle.

Circulation through blood vessels—arteries, capillaries and veins.

The course of circulation.

Importance of blood pressure.

Lymph—its formation and functions.

*Physiology of Respiration—*

General structural consideration of the organs of respiration.

Mechanics of respiration.

Mechanism of gaseous interchange in lungs and tissues.

State of the gases in blood.

*The Excretory System—*

Kidneys—their structure and functions.

Skin—its structure and diverse functions.

*The Nervous System—*

Neurone—the unit of the nervous system.

Sensory and motor nerves.

Reflex action.

Reflex functions of the spinal cord, medulla, midbrain and cerebellum.

Functions of cerebrum.

Autonomic system as different from the cerebro-spinal nervous system.

*The Sensory System—*

General consideration of the structure of Nose, Tongue, Eye and Ear as sensory organs.

*(Practical and Demonstration)*

Study of the Compound Microscope.

Microscopical examination of Yeast and Paramoecium.

Demonstration of pithing of frog. Dissection of frog (Demonstration).

Dissection of a mammal—a cat or rabbit (Demonstration).

Microscopical examination of epithelial tissues—squamous and ciliated.

Demonstration under the microscope of Compound epithelium.

Microscopical examination of connective tissues—Areolar and Cartilage.

Microscopical examination of voluntary muscle fibres and nerve fibres.

Microscopical examination of blood films—human and amphibian—staining of blood film.

Demonstration of circulation of blood through capillaries.

Demonstration of clotting of blood.

Chemical tests of Starch, Dextrin, Cane sugar and Reducing sugars.

Hydrolysis of Starch and Cane sugar.

Chemical tests for Proteins and some simple tests for Fat.

Myographic demonstration of effect of stimulation on nerve muscle preparation of frog.

Myographic demonstration of Normal heart beat of frog.

## GEOLOGY

(Theoretical)

The Earth—condensation from a hot gaseous state; latest theory of its origin; why Laplace's hypothesis was discarded.

The crust—mode of origin and character of igneous, sedimentary and metamorphic rocks.

The nucleus—how we can arrive at an idea about the earth's interior temperature and other physical condition; chemical constitution.

Earthquakes—causes, effects, distribution. Earthquake shock—propagation; Seismograph.

Earth movements—folding; faulting; landslide and its causes.

Volcanoes—distribution; characteristics of volcanic eruption.

Soil—agencies of formation; varieties; classification according to physical properties; chemical composition bearing on plant life.

Formation of coal—*in situ* and drift theories.

Formation of mineral oil.

(Practical)

1. Recognition of the hand-specimens of the rock-forming minerals and the chief types—igneous, sedimentary and metamorphic rocks.

2. An elementary study of the more important rock-forming minerals under the microscope.

3. Recognition of the more important classes and orders of fossils found in the sedimentary rocks, *e.g.*, Foraminifera, Radiolaria, Corals, Graptolites, Echinoderms, Brachipods, Pelecypods, Gastropods, Trilobites.

### ESSAY AND COMPOSITION

Essay and Composition in one of the Modern Indian Languages (Bengali or Hindi or Urdu or Assamese), or in English in the case of those whose mother-tongue is not one of the above four languages.

This paper will mainly be a test of the candidate's capacity for dealing with general topics and with the various school subjects through the medium of the language chosen by him.

### ADDITIONAL PAPER

(Optional)

Any one of the following subjects :—

#### (A) *Mental and Educational Measurements—*

Nature of intelligence and other mental characteristics.

Principles of Testing.

Different types of tests; Intelligence tests, Temperament test and Scholastic tests. Individual and group tests.

Vocational tests and problems of vocational guidance.

Technique of constructing and standardising tests.

Statistical methods applied to education; collection and tabulation of educational facts.

Principles of Frequency Distribution.

Measures of Variability.

Frequency curves and Normal Probability curves. Comparison of groups.

Principles of correlation.

Application of statistical method and technique to tests and test results.

(Students will be expected to do some amount of practical work in connection with this paper.)

#### (B) *Social and Abnormal Psychology applied to Education—*

Distinction between individual and social behaviour. Basic factors in social behaviour. Suggestion, sympathy and imitation.

Groups of different types; unorganised and organised groups. Special characteristics of children's gangs and groups. Group leaders. Training in leadership.

Organised institutions. Social manners and customs. Traditions. School tradition; its effect on the student.

Conflict between the individual and society. Complexes; their origin and development; their influence on mental development. Normal and abnormal minds. Criteria of normality; different conceptions. The psychoanalytic standpoint.

Mental deficiency. Types of maladjusted children. Backward children. Problem children. Delinquent children. Social and criminal tendencies in behaviour.

Treatment and education of maladjusted children; special responsibilities of the school.

(C) *Mental Hygiene and Child Guidance—*

The problems of Mental Hygiene. Bodily Hygiene and Mental Hygiene. Factors influencing the mental development of the child; Heredity and environment.

The School. Influence of Teachers. Class-mates. Friendship.

Adolescence. Development of sex-consciousness; its influence on mental growth.

Ways of mental development. Retardation of development. Factors leading to retardation. Their working; how to overcome them.

General problems of child guidance.

Responsibilities of parents and guardians, of society, and of educational institutions.

(D) *Methods and Organisation in Nursery Schools, Kindergartens and Montessori Schools—*

Principles of child study with special reference to infant years.

Psychology of the pre-school child.

Curriculum for infant schools.

Organisation and equipment.

Short history of the Infant School Movement from Pestalozzi to Montessori. The Nursery School movement.

Selected writings of Pestalozzi, Froebel and Montessori.

(E) *Comparative Education—*

A general survey of the organisation of national systems of education and of one of the following topics, *viz.*, (i) Elementary education, (ii) Secondary education, (iii) Technical education in Secondary schools, (iv) Adult education—with special reference to Great Britain, France, Germany, Russia, U. S. A. and Japan.

(F) *Education of Handicapped Children with reference to any ONE of the following types—*

(i) Deaf and mute.

(ii) Visually handicapped.

- (iii) Otherwise physically handicapped, and
- (iv) Mentally retarded.

The list may be modified from time to time by the Syndicate on the recommendation of the Board of Studies in Teaching.

## SYLLABUS FOR "VISUALLY HANDICAPPED CHILDREN"

### (i) History and Survey of the Visually Handicapped.

The Blind in Ancient and Mediaeval Times.

Life and Education of a few Blind Persons (Didymus of Alexandria, Nicholas Saunderson, John Metcalf, Jacob of Netra, Maria Theresia von Paradis, Weissenburg, etc.).

Early Beginning of the Education of the Blind; Establishment and Growth of the First Blind School.

Spread of Blind Education in Europe and the U. S. A.

Tactual Education before the Introduction of Braille; the Point Systems and Later Phases of Embossed Literature.

Introduction and Development of Blind Education in India; Indian Adaptations of Braille with Special Reference to Bengali Braille.

### (ii) Psychology of the Visually Handicapped and Special Problems of their Education.

Emotional and Personality Problems of the Blind.

Sense-Perception and the Theory of Compensation.

Memory: Effects of Blindness on Memory.

Facial Vision: Factors involved in Facial Vision.

Intelligence: Adaptations of Intelligence Tests for use with the Blind

Verbalism *vs* Reality.

Phantasy Life of the Blind.

Public Attitude towards the Blind and its effects.

### (iii) Practical Aspects of the Education of the Visually Handicapped.

Aims and Functions of Blind Schools.

Practice Lessons in Standard English Braille (Grade II) and Bengali Braille. (The non-Bengali candidates are not required to study Bengali Braille.)

Education of the Partially-Sighted.

Day-School *vs* Residential Institution for the Blind.

Traits demanding special attention of Teachers.

## CHAPTER XL-A

### DIPLOMA IN SPOKEN ENGLISH

1. An examination for a Diploma in Spoken English shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Every candidate for the Diploma must have passed the Examination for the Licentiate in Teaching or for a Bachelor's Degree in any Faculty of this University.

3. Every candidate for the Diploma shall produce a certificate to show that he has received training in Elocution for a period of not less than one year under a teacher recognised for this purpose by the Board of Higher Studies in English.

4. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Board of Higher Studies in English, and a fee of Rs. 50, not less than three months before the date fixed for the commencement of the examination.

5. A candidate who fails to pass or present himself for the examination, shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of Rs. 50 on each occasion.

6. The examination shall be written and oral, and shall be conducted on the lines of a syllabus to be drawn up from time to time by the Board of Higher Studies in English and Board of Studies in English jointly. The examiners shall be appointed by the Syndicate on the joint recommendation of the Boards.

7. The Written examination will consist of one paper and will be held with a view to testing a candidate's knowledge of the elements of Phonetics with special reference to the pronunciation of English words.

8. The Oral examination will be held mainly with a view to testing a candidate's power of elocution and his ability to carry on an ordinary conversation in English.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates, arranged in order of merit, in two classes. Candidates shall be bracketed together unless the examiners are of opinion that there is clearly a difference in their merits. The candidate who is placed first in the First Class shall receive a gold medal and a prize of books to the value of Rs. 200, the candidate who is placed second in the First Class shall receive a silver medal and a prize of books to the value of Rs. 100.

## SYLLABUS

*Written Examination (Sec. 7)*

Simple questions will be set on—

- (a) The organs of speech.
- (b) The use of the voice (articulation, phrasing).
- (c) The classification and production of sounds.

*(Oral Examination (Sec. 8))*

- (a) Reading—(i) Prose : (ii) Poetry.
- (b) Recitation.
- (c) Conversation.
- (d) A short speech.

The courses of study shall be prescribed and books shall be recommended from time to time, by the Syndicate on the joint recommendation of the Board of Higher Studies in English and the Board of Studies in English.

100 marks shall be assigned to the Written examination ; the minimum required for a pass shall be 30 marks.

400 marks shall be assigned to the Oral examination ; the minimum required for a pass shall be 200 marks.

No candidate shall be declared to have passed, unless he shall have obtained the prescribed minimum in the Written as also in the Oral examination.

Candidates who pass and obtain 300 marks in the aggregate shall be placed in the First Class.

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## CHAPTER XL-B

### ENGLISH TEACHERSHIP EXAMINATION

1. The Examination for English Teachership Certificate shall be held twice in each year, ordinarily in January and July, in Calcutta and at such other places as shall, from time to time, be appointed by the Syndicate, the date to be duly notified.

2. Unless otherwise provided a candidate for the examination must have passed the Intermediate Examination and have served in a recognised school as a teacher for at least one year prior to the examination. Provided, however, that if the candidate has already graduated in any Faculty, he will be allowed to appear at the examination without being required to serve as a teacher.

He shall also produce a certificate to show that he has undergone for at least eight weeks (which need not be consecutive) a special short course of training organised or recognised by the University for the purpose :

Provided that all persons who have been teachers in English in recognised schools on 31st March, 1935, will be entitled to appear at the examination after having undergone training as above.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 10 not less than two months before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or present himself for the examination shall not be entitled to a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of Rs. 10 on each occasion but he will not be required to attend any further course of training.

5. The examination shall be written, oral and practical and shall be conducted on the lines of syllabus\* to be drawn up from time to time by the Syndicate on the joint recommendation of the Board of Studies in English and the Board of Studies in Teaching. The Paper-setters and Examiners shall be appointed by the Syndicate on the joint recommendation of the

\*The following syllabus has been approved by the Syndicate on the joint recommendation of the Board of Studies in English and the Board of Studies in Teaching :—

(a) Written Examination . . . . . 150 marks.  
There shall be one paper with two halves each of two hours and each carrying 75 marks.



**Boards.** The Syndicate shall also appoint an Examination Board to consider the results and report the same to the Syndicate for confirmation.

6. The Written examination shall consist of one paper. The Oral examination will be held mainly with a view to testing the candidate's ability to read English prose and poetry and his ability to carry on an ordinary conversation in English. The Practical examination will be held with a view to testing the candidate's ability to teach English in any of the classes of a recognised High School.

7. The examination shall be conducted as follows :—

(a) *Written—*

A small number of books will be recommended for study from which questions of a general character will be set and the candidates will be expected to answer them in the form of short essays. A choice of questions will be given.

The subjects for the Written examination shall consist of—

- (i) Method of Teaching English in India.
- (ii) Elementary Phonetics of English.
- (iii) Detailed Knowledge of English Grammar.
- (iv) English Composition in the form of short essays on subjects occurring in a number of selected texts and Translation.

The marks for written paper shall be distributed as follows :—

First half	..	{	Method of Teaching English	..	50	marks
			Phonetics	..	25	marks
Second half	..	{	Grammar	..	25	marks
			Composition	..	30	marks
			Translation	..	20	marks
Total				..	150	marks
(b) Oral Examination				..	150	marks

The Oral examination will be held mainly with a view to testing the candidate's ability to read English prose and poetry and his ability to carry on an ordinary conversation in English.

(c) Practical Examination .. 200 marks

The Practical examination will be held with a view to testing the candidate's ability to teach English in any of the classes of a recognised High School.

(b) *Oral—*

Each candidate shall be examined by a Board of at least two examiners in—

- (i) Reading aloud Prose and Poetry ;
- (ii) Conversation.

(c) *Practical—*

The candidate's ability to teach English shall be tested by a lesson on a subject selected by a candidate beforehand in such a manner as may be prescribed by the Syndicate.

8. 150 marks shall be assigned to the Written examination. The minimum required for a pass shall be 60 marks.

150 marks shall be assigned to the Oral examination, of which 100 marks shall be allotted to the reading of English prose and poetry and 50 marks to conversation. The minimum required for a pass shall be 60 marks.

200 marks shall be assigned to the Practical examination. The minimum required for a pass shall be 100 marks.

No candidate shall be declared to have passed, unless he shall have obtained the prescribed minimum in each of the written, oral and practical portions of the examination. Under certain circumstances enumerated in paragraph 9 of this chapter, exemptions from appearing at the Written examination may, however, be obtained.

9. The following teachers who have been in service in recognised schools on the 31st March, 1935, but who do not possess the qualifications mentioned in Section 9 (B) of Chapter XXI of the Regulations shall be exempted from appearing at the written portion of the examination :—

- (i) Head Masters of recognised schools.
- (ii) All Assistant Head Masters and Assistant Teachers who have served as teachers of English in recognised schools.

10. Graduates who obtained not less than 50 per cent. marks in the aggregate in English in their B A. Examination may be exempted from appearing at the written portion of the examination, even if they have not served as teachers.

11. Candidates must appear at the written, oral and Practical examinations together, unless otherwise exempted. If any candidate passes in the written portion, but fails in the oral and/or practical, he will be entitled to appear at the oral and/or practical portion of the examination, as the case may be, in the next three examinations. In case a candidate fails to pass during this period or fails in the written portion of the examination, he will have to sit at all the portions of the examination (written, oral and practical) again.

12. As soon as possible after the examination the Syndicate shall publish a list of successful candidates arranged in alphabetical order of the surnames of the candidates in one class.

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## CHAPTER XL-C

### TEACHERS' TRAINING CERTIFICATE EXAMINATIONS

- A—Examination for the Teachers' Training Certificate  
(*General*).
- B—Examination for the Teachers' Training Certificate  
(*Science*).
- C—Examination for the Teachers' Training Certificate  
(*Geography*).
- D—Examination for the Teachers' Training Certificate  
(*Art Appreciation*).

#### *A. Examination for the Teachers' Training Certificate (General)*

1. The examination for the Teachers' Training Certificate (*General*) shall be held twice in each year, ordinarily in April and September, in Calcutta and at such other places as shall, from time to time, be appointed by the Syndicate, the dates to be duly notified.

2. A candidate for the examination must have passed the Intermediate Examination and have served in a recognised school as a teacher for at least two years prior to the examination or have passed the Degree Examination and have served in a recognised school for at least one year prior to the examination. Provided, however, that if the candidate has already graduated in any Faculty with Honours or Distinction, or has obtained the Master's Degree, he will be allowed to appear at the examination without being required to serve as a teacher.

He shall also produce a certificate to show that he has undergone for at least three months a short course of training organised or recognised by the University for the purpose.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 10 not less than one month before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or appear at the examination immediately following the completion of his term, may be admitted to two subsequent examinations on payment of the prescribed fee on each occasion without undergoing any further course of training, provided that a candidate who fails in the Practical and Oral examinations will be required to produce a certificate of practice-teaching in a recognised High School from the head of the institution.

If such a candidate desires to appear at any subsequent examination other than the two mentioned above, he shall be required to undergo a fresh course of training for the full period in accordance with these regulations.

5. The examination shall be written, oral and practical, and in accordance with the prescribed syllabus. The Paper-setters and Examiners shall be appointed by the Syndicate on the recommendation of a Committee to be annually constituted by the Syndicate. The Syndicate shall also appoint an Examination Board to consider the results and report the same to the Syndicate for confirmation.

6. (a) Every candidate shall be examined in the following subjects :—

(i)	General Principles of Education	..	<i>One Paper</i>
(ii)	Educational Psychology	..	<i>One Paper</i>
(iii)	Education in Bengal and Assam	..	<i>One Paper</i>
(iv)	and (v) Methods of Teaching School Subjects,—Any two of the following School Subjects, to be selected by the candidate, viz., English, Bengali, Assamese, Mathematics, History and Hygiene	}	<i>One Paper each</i>

The Syndicate shall have power to modify or add to this list.

Each paper shall be of three hours and shall carry 100 marks.

(b) There shall also be a Practical and Oral examination, to which 100 marks shall be assigned. 50 marks shall be assigned to practice-teaching, lesson notes and tutorial work.

7. The limits of the different subjects shall be as follows :—

*(Only a general treatment of the subjects will be given)*

### (I) GENERAL PRINCIPLES OF EDUCATION

The meaning of Philosophy of education.

The function of education in the biological record.

The meaning and aim of education. Comparative study of different aims of education.

Factors of education : pupil, teacher, curriculum and educational environment.

Child-centric education : its brief history and significance.

Material for education : the child ; his nature and nurture.

General laws of learning and habit formation.

Educational agencies. School, its position and function. Need for co-operation of different educational agencies.

Curriculum ; principles of curriculum construction.

Subjects in the curriculum. Extra-curricular activities.

Methods of education.

Individual work. Kindergarten. Montessori Method. Dalton Plan. Playway in education.

Project Method and correlation of studies.  
Discipline and punishment.  
School community.  
Teaching and lesson notes.  
Tests and examinations.

## (II) EDUCATIONAL PSYCHOLOGY

### A

#### *Introduction*

Psychological aspect of education.  
Scope and methods of Educational Psychology (including statistical methods).  
Physiological basis of mind : Sense organs, muscles and the nervous system.  
Nature of mind.  
Different mental functions and their inter-relations.  
General mental development : Conditions—Heredity and Environment.

### B

#### *Original Nature*

Reflexes, Instincts and Emotions.  
Educational bearings of Instincts.  
Psychology of the Adolescent.  
Basis of character training.  
Intelligence : Theories and Methods of Measurement.  
Mental Tests.

### C

#### *Modification of Original Nature*

Learning : Animal and human learning.  
Laws of conditions.  
Learning Curve : Acquisition of skill and memorisation.  
Fatigue in learning : Transfer of training.  
Measurement of Learning ; Examination ; Scholastic Tests.

### D

#### *Guidance of Learning*

Discipline.  
Exceptional and ' problem ' children.  
Psychological foundations of some prevalent systems of education.  
Psychology of the class room methods.

### *Practical Work*

Students are expected to be familiar with the following :—

1. Simple Sensory and Motor Tests.
2. Intelligence Tests.
3. Learning curve.
4. Tests for determination of Memory Span.
5. Word Association Test.

### (III) EDUCATION IN BENGAL AND ASSAM (*Its History, Organisation and Administration*)

Education as prevailing prior to 19th century.

Early beginnings of Western education.

Anglicist-Orientalist controversy.

Macaulay's Minutes : Bentinck's Resolution.

Adam's education survey and report.

Primary Education : Hardinge schools.

Educational Despatches of 1854 and 1859.

Attempts at imposition of educational cess.

Education Commission of 1882.

Promotion of education through local self-governing bodies.

Curzon's educational policy : the Indian Universities Act of 1904.

Attempts at introduction of compulsory primary education.

Indian Educational Policy of 1913.

Calcutta University Commission.

Higher Teaching and Research in Calcutta.

Dacca University and Board of Intermediate Studies.

Bengal Primary Education Acts of 1919 and 1930 and Assam Primary Education Act of 1926.

Education of women and girls.

Present position of secondary education in Bengal and Assam, its organisation, administration and problems.

### (IV) AND (V)

Detailed Study of the Methods of Teaching *two* of the following school subjects :—(a) English, (b) Bengali, (c) Assamese, (d) Mathematics, (e) History and (f) Hygiene.

8. In order to pass, a candidate must secure 36 per cent. of the marks in each of the theoretical papers, and 40 per cent. of the marks in the Practical examination and 40 per cent. of the aggregate. If he passes, and obtains 60 per cent. of the aggregate, he shall be declared to have passed with Distinction.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates. The names of those who have passed with Distinction will be arranged in order

of merit. The names of other successful candidates will be published in alphabetical order.

10. Books shall be prescribed from time to time by the Syndicate.

*B. Examination for the Teachers' Training Certificate (Science)*

1. The examination for the Teachers' Training Certificate (*Science*) shall be held twice in each year, ordinarily in June and December, in Calcutta and in such other places as shall, from time to time, be appointed by the Syndicate, the dates to be duly notified.

2. A candidate for the examination must have passed the B.Sc. Examination or must possess qualifications considered equivalent thereto for this purpose at least one year prior to the examination and he must produce a certificate to show that he has undergone for at least three months a special course of training in Science organised or recognised by the University for the purpose.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 10 not less than one month before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or appear at the examination immediately following the completion of his term, may be admitted to two subsequent examinations on payment of the prescribed fee on each occasion without undergoing any further course of training, provided that a candidate who fails in any of the Practical examinations will be required to produce a certificate of practice-teaching in a recognised High School from the Head of the institution.

If such a candidate desires to appear at any subsequent examination other than the two mentioned above, he shall be required to undergo a fresh course of training for the full period in accordance with these regulations.

5. The examination shall be Written, Oral and Practical, and in accordance with the prescribed syllabus. The Paper-setters and Examiners shall be appointed by the Syndicate on the recommendation of a Committee to be annually constituted by the Syndicate. The Syndicate shall also appoint an Examination Board to consider the results and report the same to the Syndicate for confirmation.

6. (1) Every candidate shall be examined in the following subjects :—

- (i) Principles of Education and Methods      *One Paper*  
of Teaching Science.

(ii) Astronomy, Geology, Physics and Chemistry. *One Paper*

(iii) Botany, Zoology and Physiology .. *One Paper*

(2) (a) The first paper shall be of three hours and shall carry 100 marks.

Lesson notes and tutorial work shall carry 50 marks.

(b) Each of the second and third papers shall be of three hours and shall carry 100 marks.

(c) There shall also be Practical examinations in each of the following subjects :—

Physics, Chemistry, Geology, Botany, Zoology and Physiology, carrying total marks of 150.

7. The limits of the different subjects shall be as follows :—

## PRINCIPLES OF EDUCATION AND METHODS OF TEACHING SCIENCE

### *Principles of Education—*

Aim of education. Psychology and Education. Growth of self. General laws of learning and habit formation. Correlation of studies. Project and other methods of teaching. Lesson Notes. Tests and Examinations.

### *Methods of Teaching Science—*

(a) Aims of Science Teaching.

(b) Claims of Elementary Science to a place in the curriculum of secondary schools—purpose and construction of the syllabus—interpretation of the syllabus and the teaching of individual subjects—general nature of the teaching of science.

(c) Detailed study of the various methods—practical and theoretical—method of investigation—heuristic method ; history of discovery—Herbartian method applied to science teaching ; deductive and inductive methods—the ' sequence ' and ' forms ' of instruction—the logical and psychological sequences—analysis and synthesis generalisation—preparation of notes of lessons.

(d) Habit and skill in science teaching—instruction aiming at skill—intellectual control of data—note books—diagrams and lesson notes—text-books—reference for further reading.

The Syndicate will, from time to time, indicate the scope of the different science subjects to be taught.

8. In order to pass, a candidate must secure 36 per cent. of the marks in each of the theoretical papers, and 40 per cent. of the aggregate marks in the Practical examinations and 40 per cent. of the aggregate. If he passes, and obtains 60 per cent. of the aggregate, he shall be declared to have passed with Distinction.



9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates. The names of those who have passed with Distinction will be arranged in order of merit. The names of other successful candidates will be published in alphabetical order.

10. Books shall be prescribed, from time to time, by the Syndicate.

*C. Examination for the Teachers' Training Certificate  
(Geography)*

1. The examination for the Teachers' Training Certificate (*Geography*) shall ordinarily be held twice in each year in Calcutta and in such other places as shall, from time to time, be appointed by the Syndicate, the dates to be duly notified.

2. A candidate for the examination must have ordinarily passed the degree examination and have served in a recognised school as a teacher for at least one year prior to the examination. Graduates who have passed the Intermediate Examination with Geography as one of their subjects and Under-Graduates with special qualifications may be allowed to appear at the examination in special circumstances by the Syndicate.

He shall also produce a certificate to show that he has undergone a special course of training in Geography organised or recognised by the University for the purpose.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 10, not less than one month before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or appear at the examination immediately following the completion of his term, may be admitted to two subsequent examinations on payment of the prescribed fee on each occasion without undergoing any further course of training, provided that he will be required to produce a certificate of satisfactory practice-teaching in a recognised High School from the Head of the institution.

If such a candidate desires to appear at any subsequent examination other than the two mentioned above, he shall be required to undergo a fresh course of training for the full period in accordance with these regulations.

5. The examination shall be Written, Oral and Practical, and in accordance with the prescribed syllabus. The Paper-setters and Examiners shall be appointed by the Syndicate on the recommendation of a Committee to be annually constituted by the Syndicate. The Syndicate shall also appoint an Examination Board to consider the results and report the same to the Syndicate for confirmation.

6. (1) Every candidate shall be examined in the following subjects :—

- (i) Principles of Education and Methods of Teaching Geography. . . . . *One Paper.*
- (ii) (a) Mathematical Geography and Climatology. } *One Paper.*  
       (b) Physiography and Geomorphology and Biogeography. }
- (iii) (a) Human Geography and Commercial Geography. } *One Paper.*  
       (b) Regional Geography and Map-Making }

Each paper shall be of three hours and shall carry 100 marks.

(2) (a) There shall also be a Practical and Oral Examination to which 100 marks shall be assigned.

(b) 50 marks shall be assigned to practice-teaching, lesson notes and tutorial work and 50 marks to practical work in Surveying and Map-Making done during the three months' term.

7. The limits of the different subjects shall be as follows :—

*Principles of Education—*

Aim of Education. Psychology and Education. Growth of self. General laws of learning and habit formation. Correlation of studies. Project and other methods of teaching. Lesson notes. Tests and Examinations

*Methods of Teaching Geography—*

Geographical appliances ; maps, models, diagrams, sketches. Value of excursions and different types of practical work. Different methods of teaching according to different stages.

The Syndicate will, from time to time, indicate the scope of the different subjects enumerated in items (ii) and (iii) of Section 6.

8. In order to pass, a candidate must secure 36 per cent. of the marks in each of the theoretical papers, and 40 per cent. of the marks in the Practical and Oral examinations, and 40 per cent. of the aggregate. If he passes, and obtains 60 per cent. of the aggregate, he shall be declared to have passed with Distinction.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates. The names of those who have passed with Distinction will be arranged in order of merit. The names of other successful candidates will be published in alphabetical order.

10. Books shall be prescribed from time to time by the Syndicate.

*D. Examination for the Teachers' Training Certificate  
(Art Appreciation)*

1. The examination for the Teachers' Training Certificate (*Art Appreciation*) shall be held annually in Calcutta and in such other places as shall from time to time be appointed by the Syndicate, the dates to be duly notified.

2. A candidate for the examination must have passed the Matriculation Examination and have served as a teacher of Drawing in a recognised school for at least *one* year prior to the examination: Provided, however, that, if the candidate has passed the Final Examination of any recognised school of Art he will be allowed to appear at the examination without being required to serve as a teacher.

He shall also produce a certificate to show that he has undergone for at least three months a short course of training organised or recognised by the University for the purpose.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 10 not less than one month before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or appear at the examination immediately following the completion of his term shall not be entitled to claim a refund of the fee, but such a candidate may be admitted to one or more subsequent examinations on payment of the prescribed fee on each occasion and on his undergoing a fresh course of training as required under Section 2 above during the year immediately preceding the examination at which he presents himself.

5. The examination shall be Written and Practical, and in accordance with the prescribed syllabus. The Paper-setters and Examiners shall be appointed by the Syndicate on the recommendation of a Committee to be annually constituted by the Syndicate. The Syndicate shall also appoint an Examination Board to consider the results and report the same to the Syndicate for confirmation.

6. (a) Every candidate shall be examined in the following subjects :—

- |                                   |   |                   |
|-----------------------------------|---|-------------------|
| (i) (a) General Principles of Art | } | <i>One Paper.</i> |
| (b) Principles of Indian Art      | } |                   |
| (ii) (a) Indian Sculpture         | } | <i>One Paper.</i> |
| (b) Indian Painting               | } |                   |
| (iii) (a) Architecture            | } | <i>One Paper.</i> |
| (b) European Art                  | } |                   |

The Syndicate shall have power to modify or to add to this list.

Each paper shall be of three hours and shall carry 100 marks.

(b) There shall also be a Practical examination to which 100 marks shall be assigned. 50 marks shall be assigned to practice teaching and class work.

7. The limits of the different subjects shall be as follows :—

*I. General Principles of Art—*

- (a) What is Art ?
- (b) Evolution of Art.
- (c) Different sections of Art.
- (d) Analysis of Art.

*II. Principles of Indian Art—*

- (a) Six Limbs of Indian Painting.
- (b) Indian Artistic Anatomy.

*III. Indian Sculpture—*

Characteristics of Indus Valley, Maurya, Post-Maurya, Gupta, Post-Gupta and Mediaeval Schools.

*IV. Indian Painting—*

Characteristics of Ajanta, Mughal and Rajput Schools and Manuscript Paintings. Also modern trends.

*V. Architecture—*

- (a) Western Architecture—Characteristics of some ancient and modern styles.
- (b) Indian Architecture—Characteristics of ancient and mediaeval styles.

*VI. European Art—*

- (a) Characteristics of Principal Schools of Sculpture.
- (b) Characteristics of Principal Schools of Painting.

*VII. Minor Arts and Crafts of the East and the West (Principal types).*

*VIII. Practical and Demonstration Work—*

On selected subjects from the following :—

- (1) Paper-folding.
- (2) Lino-cut.
- (3) Cut-paper designing.
- (4) Embroidery.
- (5) Stencil work.
- (6) Clay modelling.
- (7) Toy making.
- (8) Leather work.
- (9) Fresco.
- (10) Pottery.
- (11) Wood-cut.
- (12) Wood-engraving.

The course shall include special lectures on Comparative Art including a course on General Principles of Education and Theory of Art Teaching.

8. In order to pass, a candidate must secure 36 per cent. of the marks in each of the Theoretical papers and 40 per cent. of the marks in the Practical Examination and 40 per cent. of the aggregate. If he passes, and obtains 60 per cent. of the aggregate he shall be declared to have passed with Distinction.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates. The names of those who have passed with Distinction will be arranged in order of merit. The names of other successful candidates will be published in alphabetical order.

10. Books shall be prescribed from time to time by the Syndicate.

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## CHAPTER XL-D

### APPROVAL OF RECOGNISED SCHOOLS FOR B.T. TRAINING

1. Any recognised school may apply to the Registrar for approval by the Syndicate as an institution competent to train candidates for the examination for the degree of Bachelor of Teaching for purposes of Sec. 3(b) of Chapter XI. of the Regulations.

Such school must satisfy the Syndicate that—

(i) It has a Head Master who will be able to assist the intending candidates for the B.T. Degree.

(ii) It has at least two teachers on its staff who have previously obtained a recognised diploma or degree in teaching.

(iii) It has adequate funds for the purchase of books and periodicals in accordance with such list as may be prescribed by the University. The library containing such books and periodicals should be in existence before approval takes effect.

(iv) Sufficient facilities are given to each intending candidate for study and practical work under the supervision of the Head Master and the trained teachers.

2. The University shall arrange for inspection of each school before placing it on the approved list. The inspection will, whenever possible, be conducted jointly by two persons, one of whom shall be an officer of the Education Department to be appointed by the Director of Public Instruction and the other appointed by the Syndicate. The report of the Inspectors with the observations of the Director of Public Instruction will be considered by a Committee which will be constituted as follows :—

(a) The Vice-Chancellor, *Chairman*.

(b) The Director of Public Instruction, West Bengal, or one of his nominees.

(c) Principal, David Hare Training College.

(d) University Inspector of Colleges.

(e) A representative of the Teachers' Training Department of the University, nominated by the Syndicate.

(f) Two Members of the Senate nominated by the Syndicate.

(g) One Inspector of Schools nominated by the Syndicate and approved by the Director of Public Instruction, West Bengal.

One lady member may be co-opted to the Committee, if there is no such member on the Committee otherwise.

The Syndicate may grant approval to schools on the recommendation of the Committee mentioned above ordinarily for a period of three years at a time. The Syndicate may also refer back the recommendation to the Committee for reconsideration.

The duties of the officers who will inspect such school from time to time shall be—

(i) to satisfy themselves that the school continues to fulfil conditions originally imposed and the library contains the scheduled books ;

(ii) to report whether the intending candidates are receiving instructions both theoretical and practical according to proper standard.

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## CHAPTER XL-E

### DIPLOMA IN DOMESTIC SCIENCE TRAINING

1. An examination for the Diploma in Domestic Science Training shall be held annually in Calcutta and at such other places as shall, from time to time, be appointed by the Syndicate, and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any candidate may be admitted to the examination who has passed the Intermediate Examination with Chemistry and has prosecuted a regular course of study in an institution recognised for this purpose for not less than one academical year.

A candidate who has passed the Intermediate Examination without Chemistry and has prosecuted a regular course of study in an institution recognised for the purpose for not less than one academical year, may also be admitted to the examination (a) if he has obtained a Diploma or a Certificate recognised by the University, in any of the following subjects, *viz.*—(i) Teachers' Training, (ii) First-Aid, (iii) Home Nursing, (iv) Needle Work, (v) Cookery, (vi) Arts and Crafts, or in any other subject that may be regarded by the Syndicate as equivalent thereto, or (b) if he has served as a *bona fide* teacher of Domestic Science in an institution approved by Government or recognised by the University, for a period of not less than two years.

3. Every candidate for the Diploma Examination in Domestic Science Training shall send to the Registrar his application, with a certificate in the form prescribed by the Syndicate, at least six weeks before the date fixed for the commencement of the examination.

4. A fee of Rs. 30 shall be forwarded by each candidate with his application.

A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee; but such a candidate may be admitted to one or more subsequent examinations for the Diploma in Domestic Science Training on payment of a like fee of Rs. 30.

5. Every candidate shall be examined in the following theoretical and practical portions of the course :—

#### *Theoretical*

- |      |  |               |
|------|--|---------------|
| (i)  | Theory and Practice of Teaching<br>including School Organisation | .. One Paper. |
| (ii) | Home Life and Child Psychology                                   | .. One Paper. |



- (iii) Hygiene and Home Nursing .. *One Paper.*
- (iv) Theory and Practice of Domestic Science as detailed below—
  - (a) Home Organisation, House Craft and Laundry work. .. *One Paper.*
  - (b) Cookery and Dietetics .. *One Half Paper.*
  - (c) Needlework and Designing .. *One Half Paper.*

### *Practical*

- (i) Practical work in connection with (a), (b) and (c) of sub-section (iv), Section 5 100 marks  
For (a) 50 marks, (b) 25 marks and (c) 25 marks.
- (ii) Teaching (one lesson to be given) .. 50 marks
- (iii) Record of year's work .. 50 marks

The Syndicate shall have power to modify or add to the above list on the recommendation of the Board of Studies in Teaching.

Detailed syllabus in the different subjects shall be laid down and books prescribed, from time to time, by the Syndicate on the recommendation of the Board of Studies in Teaching.

6. There shall be a written examination in each of the theoretical subjects (i) to (iv) under Section 5, and the candidates will have the option of answering the papers either in English or in Bengali or in such other language as may be prescribed by the Syndicate.

Each full paper shall be of three hours and carry 100 marks. Each half paper shall be of two hours and carry 50 marks.

7. In connection with the examination in the practical portion, oral questions may be asked on any of the practical subjects and the candidates will have the option of answering those orally either in English or in Bengali or in such other language as may be prescribed by the Syndicate.

The marks allotted for the year's record shall be given by the Head of the Institution in which the candidate has studied.

8. The candidate will be required to prepare, for presentation to the examiners, at least a week before the final Practical Examination, full teaching notes of three lessons in any three subjects under (a), (b) and (c) of sub-section (iv), Section 5. The examiners shall decide which one of the lessons prepared by the candidates shall be given.

The examiners may require a candidate to give an extra lesson if, in their judgment, such a lesson is necessary.

9. Each candidate shall give a number of lessons on the subjects (a), (b) and (c) of sub-section (iv), Section 5, in a class or classes in selected schools, under supervision. The number

of lessons may be decided by the Principal of the institution, but shall in no case be less than 20.

All lesson notes shall be preserved and be available to the examiner at the time of the final practical test in 'Teaching.'

10. In order to pass, a candidate must obtain 40 per cent. in each of the theoretical subjects (i) to (iv) under Section 5, the subjects (a) (b) and (c) under (iv) being treated as separate subjects; and also 40 per cent. in each of the practical portions (i) (ii) and (iii) under Section 5.

Candidates obtaining at least 420 marks shall be declared to have passed with Distinction, and those obtaining 280 marks shall be declared to have passed.

11. As soon as possible after the examination the Syndicate shall publish a list of successful candidates. The names of those who have passed with Distinction will be arranged in order of merit. The names of other successful candidates will be published in alphabetical order.

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## CHAPTER XL-F

### DIPLOMA IN LIBRARIANSHIP

1. An examination for a Diploma in Librarianship shall be held annually in Calcutta and at such other places as shall from time to time be appointed by the Syndicate, the dates to be duly notified.

2. Any candidate may be admitted to the examination, provided that after taking a Degree in this University he has prosecuted for not less than one year a regular course of study in the subjects offered, by him in the Librarianship Training Class organised and conducted by the University.

3. No candidate shall be admitted to the examination unless he has attended at least 75 per cent. of the lectures and Practical classes provided, and has produced the prescribed certificate.

4. Every candidate for admission to the examination shall send in his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 40 not less than two months before the day fixed for the commencement of the examination.

5. A candidate who fails to pass or appear at the examination immediately following the completion of his term shall not be entitled to claim a refund of the fee, but such a candidate may be admitted to one or more subsequent examinations on payment of the prescribed fee on each occasion on his prosecuting a fresh course of study as required under Section 2 above during the year immediately preceding the examination at which he presents himself.

6. The examination shall be both Written and Practical and in accordance with the prescribed syllabus. The Paper-setters and Examiners shall be appointed by the Syndicate on the recommendation of the Librarianship Training Committee to be annually constituted by the Syndicate. The Syndicate shall also appoint an Examination Board to consider the results and report the same to the Syndicate for confirmation.

7. Every candidate shall be examined in the following subjects and marks shall be distributed as given below :—

Subjects		Marks
(1) Classification	.. Two papers	Theoretical—one paper 75 Practical—one paper 75
(2) Cataloguing	.. Two papers	Theoretical—one paper 75 Practical—one paper 75
(3) Library Organisation and Administration	One paper	.. 100

Subjects		Marks
(4) Bibliography and Book Selection	One paper	.. 100
(5) Reference Work	One paper	.. 100
(6) General Knowledge	One paper	.. 100
(7) Languages ..	One paper	.. 100
		<hr/>
Total		.. 800

Any *two* of the following languages other than the candidate's mother-tongue are to be offered. Not more than one language is to be selected from one group :—

*Group A*

(a) French, (b) German.

*Group B*

(a) Bengali, (b) Hindi, (c) Urdu, (d) Assamese.

*Group C*

(a) Sanskrit, (b) Arabic, (c) Persian, (d) Latin, (e) Greek.

The Syndicate shall have power to modify or to add to this list. Each paper shall be of three hours.

8. In order to pass, a candidate must obtain 40 per cent. of the marks in each paper and 50 per cent. of the aggregate. If he passes and obtains 66 per cent. of the aggregate, he shall be declared to have passed with Distinction.

9. As soon as possible after the examination the Syndicate shall publish a list of the successful candidates. The names of those who have passed with Distinction will be arranged in order of merit. The names of the other successful candidates will be published in alphabetical order.

10. The limits of the different subjects shall be as indicated below. Books shall be prescribed and the limits of subjects may be modified from time to time by the Syndicate on the recommendation of the Librarianship Training Committee :—

CLASSIFICATION

*Paper I*

Library Classification : Theoretical

Nature and purpose of Classification. Theory and general rules of classification. History and comparative study of the principal schemes of library classification. Critical study of different classification schemes with special reference to Dewey's Decimal System.

*Paper II*

Library Classification : Practical

Practical course in classification schemes.

CATALOGUING

*Paper I*

Library Cataloguing : Theoretical

Object and purpose of Cataloguing. History of library-cataloguing, various forms and kinds of catalogues and their

purpose. Comparative study of cataloguing codes, particularly the Anglo-American Code. Special problems of cataloguing in Indian libraries. Special cataloguing: maps, plans, prints, etc. Methods of displaying catalogues.

### *Paper II*

#### Library Cataloguing: Practical

Practical course in library cataloguing in accordance with the Anglo-American cataloguing code, with special reference to Indian problems.

#### *Library Organisation and Administration*

Library Organisation. Modern idea of the Library. Library Legislation. Library planning. Library furniture. Special libraries. History of library movement in different countries, with special reference to India.

Library staff. Ordering, accessioning and preparing books for the shelves. Library records. Method of work for different sections and departments. Library finances and statistics. Library Committee. Annual Report. Library extension work. Preservation of Books, Records and other library materials. Stack Room and shelving methods. Stock-taking. Charging system and lending methods.

#### *Bibliography and Book Selection*

Essentials of good book-production. Collation and Description of books, Material of Bibliographies. Compilation of Bibliographies. Historical Bibliographies. History of printing; paper and book-binding. Book illustration. History of authorship. Publishing and Book-selling. Different kinds of Bibliography. Preparation of copy for the press, styles of printing and proof-reading.

Principles of book selection. Aids and guides to selection. Method of selection. Book Selection Committee—its formation and function.

#### *Reference Work*

Different types of Reference work. Essential equipment of a Reference library. Reference library methods and routine.

#### *General Knowledge*

Such general knowledge as enables one to handle books in the library on various subjects, the subjects to be prescribed from time to time by the Syndicate on the recommendation of the Librarianship Training Committee.

#### *Languages*

Such working knowledge of the languages as enables one to follow intelligently the contents and the title pages of books and periodicals.

## CHAPTER XL-G

### CERTIFICATE IN LANGUAGES

1. An examination for the Certificate in Languages shall be held annually in Calcutta and in such other places as shall from time to time be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Any Graduate in Arts, Science, Law, Medicine and Engineering may be admitted to this examination provided that after graduation he has completed a regular course of study in the subjects for the examination for one academical year in the University or in any Institution recognised by the University for the purpose.

3. Every candidate sent up for the examination shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the periodical examinations of the Institution and other tests, and (d) of probability of passing the examination. Every candidate shall send in his application with a certificate in the prescribed form to the Registrar at least six weeks before the date fixed for the commencement of the examination.

4. A fee of Rs. 40 shall be forwarded by each candidate with his application. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass or appear at the examination may be admitted to one or more subsequent examinations on payment of a like fee of Rs. 40 on each occasion.

If a student, after completion of the regular course of study for the examination does not register himself as a candidate for or does not present himself at or fails to pass the examination immediately succeeding such completion he may appear at any of the two following examinations on payment of the prescribed fee only. No such candidate will be allowed to appear at any subsequent examination unless he prosecutes a fresh course of study as required under Section 2 above.

5. Every candidate shall be examined in one of the following languages :—

- (1) French.
- (2) Spanish.
- (3) Portuguese.
- (4) Italian.
- (5) German.
- (6) Russian.
- (7) Persian.

- (8) Pashtoo.
- (9) Arabic (Modern with special reference to Iraqui and Syrian Dialects).
- (10) Tibetan (Modern).
- (11) Burmese.
- (12) Chinese (Standard National Speech—Kuo-yu).
- (13) Japanese.
- (14) Indonesian (Malay).
- (15) Any one of the following Modern Indian Languages (open only to those whose mother-tongue is not any of the Indian Languages) :—
  - (1) Bengali, (2) Hindi and (3) Urdu.

The above list may be modified by the Syndicate from time to time.

6. The examination shall be Written and Oral. Candidates will be required to pass both in the Written and Oral examinations.

7. The course of study shall be as follows :—

#### I. Written examination—

Two papers of 100 marks each .. .. 200 marks

(a) Paper I 100

(i) Translation into English 50  
from prescribed as well  
as unseen texts.

(ii) Translation from English 50

(b) Paper II will consist of the 100  
following :—

- (i) Questions on grammar (a study of the characters in case of Chinese and Japanese).
- (ii) Composition—l e t t e r writing, paraphrase, summary, essay, etc.
- (iii) Phonetics
- (iv) General History and Culture of people. 40

#### II. Oral Examination—

One Paper .. .. 100 marks

- (i) Dictation in the language in its original script.
- (ii) Reading aloud from newspapers.
- (iii) Describing a picture in the language.
- (iv) Translation at sight from English.
- (v) Translation at sight into English.
- (vi) Simple Conversation.

The Post-Graduate Executive Committee in Arts shall have power to add to or modify the list on the recommendation of the Board of Higher Studies in Modern Languages which will be organised within five years after the regular institution of the course.

Books shall be prescribed or recommended by the Executive Committee concerned on the recommendation of the relevant Committee or Board of Higher Studies.

8. In order to pass the examination a candidate must obtain at least 45 per cent. of total marks in both Written and Oral examinations. Candidates obtaining 60 per cent. of the total marks in the aggregate shall be placed in the Second Class and those obtaining 75 per cent. of the total marks in the aggregate shall be placed in the First Class and the rest will be placed in the Third Class.

9. As soon as possible after the examination, the Post-Graduate Executive Committee in Arts shall publish a list of the candidates who have passed, arranged in classes indicated above, each in order of merit. Each successful candidate shall be given a certificate in the form prescribed in Appendix 'A'.

10. If the Examination Board is of opinion that in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular paper or in the aggregate it shall forward the case to the Syndicate with a definite recommendation and the reason for such recommendation. The Syndicate may accept the recommendation or refer the matter back to the Board for reconsideration.



## CHAPTER XL-H

### DIPLOMA IN LANGUAGES

1. An examination for the Diploma in Languages shall be held annually in Calcutta and in such other places as shall from time to time be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Any Graduate in Arts, Science, Law, Medicine and Engineering may be admitted to this examination provided he has after passing the Certificate Examination in Languages completed a regular course of study in the subjects for the examination for one academical year in the University or in any Institution recognised by the University for the purpose.

3. Every candidate sent up for the examination shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the periodical examinations of the Institute and other tests, and (d) of probability of passing the examination. Every candidate shall send in his application with a certificate in the prescribed form to the Registrar at least six weeks' before the date fixed for the commencement of the examination.

4. A fee of Rs. 60 shall be forwarded by each candidate with his application. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass or to appear at the examination may be admitted to one or more subsequent examinations on payment of a like fee of Rs. 60 on each occasion.

If a student after completion of the regular course of study for the examination does not register himself as a candidate for or does not present himself at or fails to pass the examination immediately succeeding such completion, he may appear at any of the two following examinations on payment of the prescribed fee only. No such candidate will be allowed to appear at any subsequent examination unless he prosecutes a fresh course of study as required under Section 2 above.

5. Every candidate shall be examined in one of the following languages :—

- |                |   |
|----------------|---|
| (1) French     | (9) Arabic (Modern with special reference to Iraqi and Syrian Dialects) |
| (2) Spanish    | (10) Tibetan (Modern)   |
| (3) Portuguese | (11) Burmese  |
| (4) Italian    | (12) Chinese (Standard National Speech—Kuo-yu.)                         |
| (5) German     | (13) Japanese   |
| (6) Russian    | (14) Indonesian (Malay)   |
| (7) Persian    | (15) Any one of the following Modern                                    |
| (8) Pashtoo    |   |

Indian Languages (open only to those whose mother-tongue is not any of the Indian Languages):—

(1) Bengali, (2) Hindi, and (3) Urdu.

The above list may be modified by the Syndicate from time to time.

6. The examination shall be Written and Oral. Candidates will be required to pass both in the Written and in the Oral examinations.

7. The course of study shall be as follows:—

	<i>marks</i>
1. Written 3 papers of 100 marks each .. ..	300
(a) Paper I .. ..	100
(i) Questions on the prescribed text books ..	70
(ii) Questions on Grammar (Study of characters ..	30
will be considered as part of Grammar in ..	
Chinese and Japanese).	
(b) Paper II will include .. ..	100
(i) Translations from unseen in the language into English ..	
(ii) Translation from English ..	
(iii) Free Composition (Essay, etc.) ..	
(c) Paper III .. ..	100
(i) History of Civilisation of the people concerned ..	70
(ii) Phonetics (including for Chinese and Japa- ..	30
nese, a study of the history of the script).	
II. Oral Examination will include, among other tests, the ..	200
following:—	
(i) Dictation in the original script ..	
(ii) Dictation in Phonetic script ..	
(iii) Reading and explanation of an unseen passage ..	
(iv) Translation at sight from English ..	
(v) Translation at sight from the language ..	
(vi) General Conversation (books to be recommended ..	
for this part of the Oral Test.)	

The Post-Graduate Executive Committee in Arts shall have power to add to or modify the list on recommendation of the Board of Higher Studies in Modern Languages which will be organised within a period of five years after the regular institution of the course.

Books shall be prescribed or recommended by the Executive Committee concerned on the recommendation of the relevant committee or Boards of Higher Studies.

8. In order to pass the examination a candidate must obtain at least 45 per cent. of the total marks in both Written and Oral examinations. Candidates obtaining 60 per cent. of the total marks in the aggregate shall be placed in the second class and those obtaining 75 per cent. on the total marks in the

aggregate in the first class and the rest will be placed in the third class.

9. As soon as possible after the examination the Executive Committee concerned shall publish a list of successful candidates arranged in classes as indicated above each in order of merit. Each successful candidate shall be given a Diploma in the form prescribed in Appendix 'A'.

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## CHAPTER XLI

### BACHELOR OF LAWS

1. Every candidate for the Degree of Bachelor of Laws shall satisfy the following conditions :—

- (i) He must have passed the Examination for the Degree of Bachelor of Arts or Bachelor of Science or Bachelor of Commerce or Bachelor of Medicine or Bachelor of Engineering.
- (ii) He must, after passing that examination, have prosecuted a regular course of study, as explained in Regulation 2, for not less than three academical years in a college affiliated in Law.
- (iii) He must pass three examinations in Law, namely,
  - (a) Preliminary Examination, not earlier than the end of the first-year of law study.
  - (b) Intermediate Examination, not earlier than the end of the second-year of law study.
  - (c) Final Examination, not earlier than the end of the third-year of law study :

Provided that a candidate who has been placed in the First Class at the Preliminary Examination may take the Final Examination in the middle of the third-year of his law study, if during the year and half which elapses after he has passed the Preliminary Examination, he has attended the full course prescribed for the Intermediate and Final Examinations.

All the three examinations shall be held six-monthly but, subject to the exception mentioned in Regulation 11, no candidate shall be admitted to the Intermediate Examination, until six months after he passes the Preliminary Examination.

2. No candidate shall be considered to have prosecuted a regular course of study, unless he has attended—

- (i) at least three-fourths of the full number of lectures in each subject or group of subjects mentioned in Regulation 4, as forming the subject of a separate paper (such full number not being less than 32) ;
- (ii) at least three-fourths of the full number of sittings of a Moot Court in each of the said subjects or groups of subjects [other than subjects (i) and (ii) for the Preliminary Examination] (such full number not being less than 12).

Foot-note—[Holders of B. L. Degree will be entitled to use the Degree of L L. B.] (Senate, dated the 30th July, 1949).

3. The Preliminary, Intermediate and Final Examinations shall be Written and may also be partly Oral.

4. The following shall be the subjects for the Preliminary, Intermediate and Final Examinations, respectively :—

#### FOR THE PRELIMINARY EXAMINATION

- |       |                            |                   |
|-------|----------------------------|-------------------|
| (i)   | Jurisprudence .. .. .      | <i>One Paper.</i> |
| (ii)  | Roman Law .. .. .          | <i>One Paper.</i> |
| (iii) | *Hindu Law .. .. .         | <i>One Paper.</i> |
| (iv)  | Constitutional Law .. .. . | <i>One Paper.</i> |

#### FOR THE INTERMEDIATE EXAMINATION

- |       |  |      |                   |
|-------|--|------|-------------------|
| (i)   | Mahomedan Law                              | } .. | <i>One Paper.</i> |
|       | and  |      |                   |
| (ii)  | The Law relating to Persons                |      |                   |
| (iii) | The Law relating to Property, including    |      | <i>One Paper.</i> |
|       | (a) the Law of Transfer <i>inter vivos</i> |      |                   |
|       | and  |      |                   |
|       | (b) Principles of the English Law of       |      | <i>One Paper.</i> |
|       | Real Property and the Law of In-           |      |                   |
|       | testate and Testamentary Succes-           |      |                   |
|       | sion (exclusive of the Hindu and           |      |                   |
|       | the Mahomedan Law of Intestate             |      |                   |
|       | Succession).                               |      |                   |
| (iv)  | The Law of Contracts and Torts ..          |      | <i>One Paper.</i> |

#### FOR THE FINAL EXAMINATION

- |       |   |                   |
|-------|---|-------------------|
| (i)   | The Law relating to Property, including the Law of Land Tenures, Land Revenue and Prescription. | <i>One Paper.</i> |
| (ii)  | The Principles of Equity, including the Law of Trusts.  | <i>One Paper.</i> |
| (iii) | The Law of Evidence and the general principles of Civil Procedure and Limitation.               | <i>One Paper.</i> |
| (iv)  | The Law of Crimes and the general principles of Criminal Procedure.                             | <i>One Paper.</i> |

\* Candidates from Burma will be allowed optionally to offer "Burmese Buddhist Law" in place of "Hindu Law".

5. The limits of each subject mentioned in the preceding regulation shall be indicated by the Syndicate from time to time by reference to text-books, and Legislative Acts and Statutes where necessary. The Syndicate shall also prescribe, in connection with each subject [other than subjects (i) and (ii) for the Preliminary Examination] a list of leading cases to be studied in the original judgments as expositions of important legal principles. Every College affiliated in Law shall make suitable provision for a Law library so as to enable its students to have access to the reports or other books in which the selected cases may be found.

6. A Preliminary Examination, an Intermediate Examination and a Final Examination in Law shall be held six monthly in Calcutta and in such other places as the Syndicate may, from time to time, determine and shall commence at such time as the Syndicate may fix, the approximate dates to be notified in the Calendar.

7. Any Bachelor of Arts or Bachelor of Science or Bachelor of Commerce or Bachelor of Medicine or Bachelor of Engineering, who has, after passing his Degree Examination, prosecuted a regular course of study as explained in paragraph 2, so far as the subjects for the Preliminary Examination in Law are concerned, may be admitted to that examination, if he sends to the Registrar his application with a fee of thirty rupees and with a certificate in the form prescribed by the Syndicate, at least thirty days before the date fixed for the commencement of the examination.

A candidate, who fails to pass or present himself for examination, shall not be entitled to obtain a refund of the fee.

8. As soon as possible after the examination the Syndicate shall publish a list of the names of the successful candidates arranged in two classes, the first in order of merit and the second in alphabetical order.

The first student of the first class shall be entitled to a prize of books of the value of Rs. 100, and the second student of the first class shall be entitled to a like prize of Rs. 50.

9. Any student who has passed the Preliminary Examination and has prosecuted a regular course of study as explained in paragraph 2, so far as the subjects for the Intermediate Examination in Law are concerned may be admitted to that examination, if he sends to the Registrar his application with a fee of thirty rupees and with a certificate in the form prescribed by the Syndicate, at least thirty days before the date fixed for the commencement of the examination.

A candidate who fails to pass or present himself for examination shall not be entitled to a refund of the fee.

10. As soon as possible after the Intermediate Examination, the Syndicate shall publish a list of the names of the suc-

successful candidates arranged in two classes, the first in order of merit, and the second in alphabetical order.

The first student of the first class shall be entitled to a prize of books of the value of Rs. 100, and the second student of the first class shall be entitled to a like prize of Rs. 50.

11. A student may, during the second year of his Law study, prosecute a regular course of study as explained in paragraph 2, in the subjects for the Intermediate Examination, notwithstanding that he has not already passed the Preliminary Examination. And no student shall be debarred from prosecuting such regular course of study, in the subjects for the Final Examination in the third-year of his Law study, by reason of his failing to pass or present himself for the Preliminary Examination at the end of the first year or the Intermediate Examination at the end of the second year. But no one who is not a Master of Arts or Science shall be admitted to the Intermediate Examination until six months after his passing the Preliminary Examination.

12. Any Bachelor of Arts or Bachelor of Science or Bachelor of Commerce or Bachelor of Medicine or Bachelor of Engineering, who has after passing his Degree Examination, prosecuted a regular course of study as explained in Regulation 2, for three years or two years and a half, as the case may be, and has passed the Preliminary Examination, may be admitted to the Final Examination in Law, if he sends his application with a fee of thirty rupees and with certificates in the form prescribed by the Syndicate, to the Registrar, at least thirty days before the date fixed for the commencement of the examination :

Provided that if such candidate has not previously passed the Intermediate Examination, he must at the same time appear at the Intermediate Examination in accordance with paragraph 9.

And any one who has prosecuted a regular course of study as above mentioned, and who, as a Master of Arts or Science, is entitled under the exception in paragraph 11 to present himself for the Preliminary, Intermediate and Final Examinations in the same year, may be admitted at the same time at the three examinations, if he sends his applications with the prescribed fees and with certificates in the prescribed forms to the Registrar, at least thirty days before the date fixed for the commencement of the earliest of these examinations.

A candidate under any of the preceding paragraphs who fails to pass or present himself for examination shall not be entitled to obtain a refund of the fee.

13. As soon as possible after the Final Examination, the Syndicate shall publish a list of the names of the successful candidates arranged in two classes, each in order of merit. The first student of the first class shall be entitled to a gold medal.

and a prize of books to the value of Rs. 200, provided that he was placed in the first class also at either the Preliminary or the Intermediate Examination.

13A. If a student after completion of a regular course of study for any one of the Law Examinations does not register himself as a candidate for or present himself at the examination immediately succeeding such completion, he may appear at any of the three following examinations of the same standard, provided he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied or from a Member of the Senate testifying to his good character during the intervening period.

If such student does not register himself as a candidate for or appear at any of the three examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, provided he produces a certificate testifying to his good character during the intervening period as above and provided further that he prosecutes a fresh course of study for at least six months immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing or registering themselves at any examination under these regulations after first three chances shall be deemed to be non-collegiate students.

If a student after completion of his regular course of study registers himself as a candidate for his examination and appears at the examination but fails to complete it on account of illness or any other reasons considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who having been allowed to appear at any of the Law Examinations as a non-collegiate student on account of shortage of attendance at lectures does not register himself as a candidate for or present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students appearing under the first and second paragraphs above will be treated as non-collegiate students.

14. If a candidate who is admitted to the Intermediate and Final Examinations at the same time, succeeds in the former and fails in the latter, he shall be declared to have passed the Intermediate Examination, and he may be admitted to any subsequent Final Examination on payment of the prescribed



fee. But if he succeeds in the Final Examination and fails in the Intermediate Examination, he shall be deemed to have failed in both and he may be subsequently admitted to the two examinations at the same time on payment of the prescribed fees.

If a candidate is a Master of Arts or Science and is admitted as such to the Preliminary, Intermediate and Final Examinations at the same time, he shall be declared to have passed the examination or examinations in which he succeeds, provided that he shall not be declared to have passed the Intermediate Examination, unless he has passed the Preliminary Examination as well, nor shall he be declared to have passed the Final Examination unless he has passed both the Preliminary and Intermediate Examinations. In the event of failure he may be admitted to one, two or three of these examinations, as the case may be, at the same time on payment of the prescribed fees.

The admission of a candidate who fails in any of the Law Examinations to one or more subsequent examinations of the same standard shall be governed by the provisions of Section 13A.

15. For the Preliminary Examination four papers shall be set, each of three hours and carrying 100 marks.

For the Intermediate Examination four papers shall be set, each of three hours and carrying 100 marks.

For the Final Examination four papers shall be set, each of three hours and carrying 100 marks.

16. In the third paper for the Preliminary Examination and in every paper for the Intermediate and Final Examinations, 40 marks shall be allotted to questions framed with a view to test the ability of candidates to apply the more important legal principles to concrete cases. Full credit shall be given for well-reasoned answers to such questions, even if the conclusions happen to differ from the views taken in decided cases. No credit shall be given for bare answers unsupported by arguments.

17. In order to pass the Preliminary Examination, a candidate must obtain—

In each paper	..	..	30 marks
and in the aggregate	..	..	200 marks
In order to be placed in the first class, a candidate must obtain—	..	..	267 marks

18. In order to pass the Intermediate Examination, a candidate must obtain—

In each paper	..	..	30 marks
and in the aggregate	..	..	200 marks
In order to be placed in the first class, a candidate must obtain—	...	...	267 marks

19. In order to pass the Final Examination, a candidate must obtain—

In each paper	..	..	30 marks
and in the aggregate	..	..	200 marks
In order to be placed in the first class, a candidate must obtain—	..	..	267 marks

20. Any candidate who has failed in one paper only at any of the three examinations, and by not more than 5 marks and has shown merit by gaining 60 per cent. or more in the aggregate of the marks of the examination, shall be allowed to pass. In order to determine the division in which such a candidate shall be placed and his place in the class, the number of marks by which he has failed in one paper shall be deducted from his aggregate.

If the examiners are of opinion that in the case of any candidate at any of these examinations not covered by the preceding regulation, consideration ought to be allowed by reason of his high proficiency in a particular subject or in the aggregate, they shall report the case to the Syndicate, and the Syndicate may pass such candidate.

21. Each successful candidate at the Preliminary and the Intermediate Examinations shall receive a certificate in the form entered in Appendix A.

Each successful candidate at the Final Examination shall receive with his Degree of LL.B. a diploma in the form entered in Appendix A, setting forth the class in which he was placed.

22. For the purpose of Section 13A, a student shall be deemed to have completed his regular course of study (a) for the Preliminary Examination at the end of the first-year of his Law study; and (b) for both the Intermediate and the Final Examinations, at the end of the third-year of his Law study.

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## CHAPTER XLII

### MASTER OF LAWS.

1. An Examination for the Degree of Master of Laws shall be held annually in Calcutta, commencing at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any candidate who has obtained the Degree of Bachelor of Laws may be examined for the Degree of Master of Laws.

3. Every candidate shall send his application with a fee of two hundred rupees to the Registrar at least three months before the date fixed for the commencement of the examination. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee.

4. Every candidate shall be examined in the following subjects :—

(1) Hindu Law or Mahomedan Law.

(2) Jurisprudence and Principles of Legislation.

(3) Principles and History of Roman Law.

(4) Private International Law.

(5) and (6) Any two of the following subjects, namely :—

(i) Principles of Equity.

(ii) The Law relating to the Transfer of Immovable Property and the Law of Prescription.

(iii) The Law relating to Wills.

(iv) The Law of Contracts and Torts.

(v) Principles and History of the Law of Real and Personal Property.

(vi) Principles and History of the Law of Evidence.

(vii) History of English Law.

5. Six papers shall be set to each candidate, one on each of the six subjects. Each paper shall be of three hours and shall carry 100 marks.

There shall be a *viva voce* examination of each candidate, if the examiners think fit.

6. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed, arranged in two classes, each in order of merit. Candidates shall be bracketed together, unless the examiners are of opinion that there is clearly a difference in their merits.

7. Each successful candidate shall receive with his Degree of LL.M.\* a diploma in the form entered in Appendix A, setting forth the class in which he was placed. The candidate who is placed first in the first class shall receive a gold medal and a prize of books to the value of Rs. 200.

8. In order to pass the examination for the Degree of Master of Laws, a candidate must obtain—

In each paper	..	50 marks.
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In order to be placed in the first class, a candidate must further obtain—

In the aggregate	..	400 marks.
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9. The examiners shall have regard to the style and method of the answers submitted by the candidates, and shall give credit for excellence in these respects.

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\* The holders of M.L. Degree will be entitled to use the degree of LL.M. Senate, dated 30th July, 1949).

## CHAPTER XLIII

### DOCTOR OF LAWS

1. Any Master of Laws of the University of Calcutta may offer himself as a candidate for the Degree of Doctor of Laws, provided one year has elapsed from the time when he passed the examination for the Degree of Master of Laws.

2. Every candidate shall state in his application the special subject within the purview of the Regulations for the Degree of Master of Laws, upon a knowledge of which he rests his qualification for the Doctorate, and shall, with the application, transmit three copies, printed or type-written, of a thesis that he has composed upon some branch of law, or of the history or philosophy of law. The candidate shall indicate generally in a preface to his thesis and specially in notes, the sources from which his information is taken, the extent to which he has availed himself of the work of others, and the portions of the thesis which he claims as original; he shall further state whether his research has been conducted independently, under advice, or in co-operation with others, and, in what respects his investigations appear to him to advance the study of law.

3. Every candidate may also forward with his application three printed copies of any original contribution or contributions to the advancement of the science or study of law whether published conjointly or independently and upon which he relies in support of his candidature.

4. No application shall be entertained unless two members of the Faculty of Law or two Doctors in any Faculty of this University or of a University approved by the Syndicate from time to time shall have testified, to the satisfaction of the Syndicate, that since graduating as Bachelor of Laws, the candidate has practised his profession with repute for five years, and that in habits and character, he is a fit and proper person for the Degree of Doctor.

5. Every candidate shall forward with his application a fee of Rs. 300. No candidate who fails to pass or present himself for examination shall be entitled to claim a refund of the fee.

6. The thesis mentioned in Regulation 2 and the original contributions, if any, mentioned in paragraph 3, shall be referred by the Syndicate to a Board consisting of the Dean of the Faculty of Law and two other persons.

7. If the thesis is approved by the Board, and if the candidate has obtained a first class at the examination for the Degree of

Master of Laws, he shall not be required to submit to any further Written examination ; but he may be required by the Board, at their discretion, to appear before them to be tested orally with reference to the thesis, and the special subject selected by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the Oral examination, if any ; and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Laws, they shall cause his name to be published, with the subject of his thesis, and the titles of his published contributions (if any) to the advancement of the science or study of law.

If the candidate is a person who has obtained a second class at the examination for the Degree of Master of Laws, and if his thesis is approved by the Board he shall be required to submit to a Written examination.

Two papers of three hours each shall be set, one upon the special subject mentioned in the application of the candidate, and the other upon the subject of the thesis. The candidate may also be required by the Board, at their discretion, to appear before them to be tested orally with reference to the thesis and the special subject professed by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the Written examination, and also of the Oral examination, if any ; and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Laws,<sup>1</sup> they shall cause his name to be published, with the subject of his thesis, and the titles of the published contributions (if any) to the advancement of the science or study of law.

9. In the case of a candidate falling under the preceding Regulation, if the Board, upon an examination of his thesis and of his original contribution or contributions to the advancement of the science or study of law, hold the same to be generally or specifically of such special excellence as to justify the exemption of the candidate from the Written examination, he may be so exempted by the Syndicate, provided that the report of the Board shall set forth the fact and grounds of such exemption.

10. A diploma under the seal of the University and signed by the Vice-Chancellor, shall be delivered at the next Convocation for conferring Degrees to each candidate who has qualified for the Degree.

11. Every candidate shall be at liberty to publish his thesis, and the thesis of every successful candidate shall be published by the University with the inscription "Thesis approved for the Degree of Doctor of Laws in the University of Calcutta."

<sup>1</sup> Holders of D.L. Degree will be entitled to use the Degree of LL.D. (Senate, dated 30th July, 1949).

## CHAPTER XLIV

### FIRST M.B.B.S. EXAMINATION

1. Any undergraduate of the University may be admitted to this examination provided he has fulfilled the following conditions :—

(a) That he has attained the age of seventeen years or will attain that age on the 31st December of the year of his admission into a College of Medicine affiliated to the University.

(b) That he has passed the Intermediate Examination in Science with Physics, Chemistry and Biology (including practical tests).

(c) That he has attended a regular course of study, Theoretical and Practical, for not less than two years at a College of Medicine affiliated to the University up to the standard of the First M.B.B.S. Examination, subject to the provision in clause 3 below.

2. The examination shall be held twice in each year, ordinarily in April and November, and shall commence on such dates as the Syndicate shall determine. Every candidate for admission to this examination shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate and the fee of Rupees Fifteen for Part I, Rupees Thirty-five for Part II or Rupees Fifty for Parts I and II, at least twenty-one days before the date fixed for the commencement of the examination. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee, but he may be admitted to one or more subsequent examinations on payment of the prescribed fee on each occasion on producing a certificate that he has, since the date of the last examination and within six months preceding the examination which he intends appearing at, attended to the satisfaction of the Principal of the College a further course of study in the subject or subjects for that examination in which he had failed.

3. The First M.B.B.S. Examination shall be divided into two Parts as shown below :—

Part I—Organic and Physical Chemistry

(This may be taken at the end of the first year.)

Part II—(i) Anatomy

(ii) Physiology

(iii) Elementary Pharmacology

The examination shall be Written, Oral and Practical. In assessing marks at the Practical examination the examiners will take into account the records of the work done in the Practical classes by the students during their period of study, which should be duly attested by the teachers in the subjects included in Part I and Part II.

The examination in Organic and Physical Chemistry shall consist of—

- (a) One Theoretical paper
- (b) a Practical examination, and
- (c) an Oral examination

The examination in Anatomy shall consist of—

- (a) Two Theoretical papers,
- (b) a Practical examination, and
- (c) an Oral examination

The examination in Physiology shall consist of—

- (a) Two Theoretical papers,
- (b) a Practical examination, and
- (c) an Oral examination.

The examination in Elementary Pharmacology shall consist of—

- (a) One Theoretical paper
- (b) a Practical examination, and
- (c) an Oral examination

Three hours shall be allowed for each paper in each subject.

Candidates who passed the B.Sc. Examination with Chemistry will not be excused attendance at lectures and practical work in Organic and Physical Chemistry as also examination (Theoretical, Practical and Oral) in that subject.

4. In order to pass the First M.B.B.S. Examination a candidate must pass in all subjects of Part I and Part II.

A candidate who fails to pass or to appear in Part I and/or Part II may appear in the subject or subjects in which he failed to pass or to appear at subsequent examinations provided that the two parts of the examination shall be completed within a period of nineteen months.

5. As soon as possible after the examination the Syndicate shall publish a list of successful candidates arranged in alphabetical order. Every candidate shall, on passing, receive a certificate in the form entered in Appendix A. Candidates who obtain at least 75% of marks in any subject shall be deemed to have passed with Honours in that subject, provided the candidate has passed in all parts of the First M.B.B.S. Examination in his first attempt.

On the recommendation of the examiners in a particular subject a gold medal may be awarded to a candidate who has



particularly distinguished himself in honours in that subject for that examination.

6. The full marks for each subject and the minimum marks required for passing shall be as follows :—

	Written Full Marks	Oral Full Marks	Written & Oral Pass Marks	Practical Full Marks	Practical Pass Marks	Total Full Marks	Total Pass Marks
<b>Part I—</b>							
Organic and Physical Chemistry.	100	50	60	50	25	200	100
<b>Part II—</b>							
Anatomy ..	200	100	120	100	50	400	200
Physiology ..	200	100	120	100	50	400	200
Elementary Pharmacology	100	50	60	50	25	200	100

7. The course of study for the First M.B.B.S. Examination shall be as follows :—

(i) Organic and Physical Chemistry.

(ii) Anatomy.

(iii) Physiology.

*Note.*—The demonstration of structure and function in the teaching of Anatomy and Physiology should be correlated and done as far as possible on the living subject. Instruction in Anatomy should include information obtained from Radiology.

(iv) Elementary Pharmacology.

(v) Elementary Normal Psychology.

(vi) Introduction to Pathology and Bacteriology.

*Note.*—This last subject should include the normal reaction of the body to injury and infection as an introduction to General Pathology and Bacteriology. No examination in subjects (v) and (vi) will be held at this stage.

8. The limits of the subjects shall be as follows :—

## ORGANIC AND PHYSICAL CHEMISTRY

The whole course in Theoretical Chemistry should be treated in an elementary way with special reference to the needs of the medical students.

## ANATOMY

A complete course of Human Anatomy including—

(A) Dissection of the entire cadaver.

(B) Anatomy of the living body.

(C) Elements of human embryology.

(D) Elements of Genetics.

## PHYSIOLOGY

I. A course of lectures on Physiology, including instruction in Biophysics and Biochemistry.

II. A practical course of Experimental Physiology.

III. A practical course of Normal Histology and the elements of Cytology.

IV. A practical course of Biophysics and Biochemistry.

## ELEMENTARY PHARMACOLOGY

### ELEMENTARY PHARMACOLOGY AND PHARMACY

General character of drugs (vegetable, mineral and organic), their official preparations and composition, a knowledge of administration of drugs, channel of administration, knowledge of incompatibilities and the knowledge of the action of drugs in a general way.

9. The number of lectures and practical classes will be as follows :—

I. Organic and Physical Chemistry—Lectures, 40. Practical classes, 25 (of two hours each).

II. Anatomy—Lectures, 100 (2 courses of 50 lectures each).

III. Physiology—(a) Lectures, 100 (2 courses of 50 lectures each).

(b) Practical classes in Biochemistry, 25 (of two hours each).

(c) Practical classes in Experimental Physiology, 25 (of two hours each).

(d) Practical classes in Histology, 25 (of two hours each).

IV. Elementary Pharmacology—25 lectures or demonstrations, Practical classes, 25.

V. Introduction to Pathology and Bacteriology—20 lectures or demonstrations.

VI. Elementary Normal Psychology—8 lectures.

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## CHAPTER XLV

### FINAL M.B.B.S. EXAMINATION

1. Any candidate who fulfils the following conditions may be admitted to this examination :—

(a) That he has passed the First M.B.B.S. Examination at least three years previously.

(b) That he has completed a regular course of study, theoretical and practical, in the subjects of the examination extending over a period of at least three years subsequent to his passing the First M.B.B.S. Examination in a College of Medicine affiliated to the University to the Final M.B.B.S. standard, subject to the provision in clause (3) below.

2. The Final M.B.B.S. Examination shall be divided into two parts, Part I and Part II, embracing subjects as defined hereafter.

The examination in each part shall take place twice in each year, ordinarily in April and November, and shall commence on such dates as the Syndicate shall determine. Every candidate for admission to the examination shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate and a fee of Rs. 40 for each part of the examination, at least twenty-one days before the date fixed for commencement of the examination. A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee, but may be admitted to one or more subsequent examinations in that part on payment of the prescribed fee on each occasion on producing a certificate that he has, since the date of the last examination and within the six months preceding the examination which he intends appearing at, attended to the satisfaction of the Principal of the College a further course of study in each of the subjects in which he had failed or did not appear at the previous examination.

A candidate may appear in Groups A, B and C of Part I at the end of the 4th-year. A candidate may however take up at the end of the 5th-year Part I and Part II separately or together.

3. Every candidate shall be examined in the following subjects :—

#### *Part I*

Group A—Pathology, Bacteriology )  
and Parasitology.

Group B—Preventive and Social  
Medicine.

Group C—Forensic and State Medi-  
cine.

These may be taken at  
the end of the 4th-  
year.

*Part II*

Group A—(i) Medicine including Applied Anatomy and Physiology, Clinical Pathology, Children's diseases, Skin diseases and Mental diseases.

(ii) Pharmacology and Therapeutics.

Group B—(i) Surgery including Applied Anatomy and Physiology, Clinical Pathology, Radiology, Orthopaedics, Venereal diseases, Dental diseases and Surgical diseases of infancy and childhood.

(ii) Ophthalmology and Diseases of Ear, Nose and Throat.

Group C—Obstetrics and Gynaecology, and Infant Hygiene including Applied Anatomy and Physiology and Clinical Pathology.

The examination shall be Written, Oral, Practical and Clinical as provided hereunder, three hours being allowed for each paper. In assessing marks the examiners will take into account the duly attested records of the work done by the candidate.

The examination in *Pathology, Bacteriology and Parasitology* shall consist of :—

(a) One Theoretical paper. An average of at least half an hour should be allowed to answer each question.

(b) A Practical examination.

(c) An Oral examination including questions on macroscopic and microscopic specimens.

The Examination in *Preventive and Social Medicine* shall consist of :—

(a) One Theoretical paper. An average of at least half an hour should be allowed to answer each question.

(b) An Oral examination.

The examination in *Forensic and State Medicine* shall consist of :—

(a) One Theoretical paper. An average of at least half an hour should be allowed to answer each question.

(b) An Oral examination.

The examination in *Medicine* shall consist of :—

(a) Two Theoretical papers. An average of at least half an hour should be allowed to answer each question.

(b) An Oral examination including questions on pathological specimens.

(c) A Practical examination including examination of secretions, interpretation of X-ray records, testing of urine, clinical microscopy and prescription writing.

(d) A Clinical examination, at least one hour being allowed to the candidate for the examination of and report on his principal case.

The examination in *Pharmacology and Therapeutics* shall consist of :—

(a) One Theoretical paper. An average of at least half an hour should be allowed to answer each question.

(b) An Oral examination.

The examination in *Surgery* shall consist of :—

(a) Two Theoretical papers. An average of at least half an hour should be allowed to answer each question.

(b) A Clinical examination, at least three quarters of an hour being allowed to the candidate for the examination of and report on his principal case.

(c) An Oral examination in which questions on Surgical Pathology, interpretation of X-ray records and pathological slides shall form special parts.

(d) A Practical examination in which questions on the use of surgical instruments and appliances, and on the application of splints and bandages shall form special parts. It shall also include Surgical Anatomy and operation on cadaver.

The examination in *Ophthalmology and Diseases of Ear, Nose and Throat* shall consist of :—

(a) One Theoretical paper. An average of at least half an hour should be allowed to answer each question.

(b) A Clinical examination and the candidate's report on his principal case.

(c) An Oral examination.

The examination in *Obstetrics and Gynaecology and Infant Hygiene* shall consist of :—

(a) Two Theoretical papers. An average of at least half an hour should be allowed to answer each question.

(b) An Oral examination including questions on pathological specimens and models.

(c) A Practical examination on Obstetrics and Gynaecology including questions on instruments and appliances.

(d) A Clinical examination, at least half an hour being allowed to the candidate for the examination of and report on his principal case.

4. As soon as possible after the examination in Part I or Part II the Syndicate shall publish a list of candidates who have passed, arranged in alphabetical order. Candidates who obtain at least 75 per cent. of marks in any group of either Part I or Part II shall be deemed to have passed with Honours in that group, provided that the candidate passes in all the groups of Part I and Part II in his first attempt.

On the recommendation of the examiners in a particular group a gold medal may be awarded to the candidate who has particularly distinguished himself in Honours in that group for that examination.

Every candidate shall, on passing both parts of the Final M.B.B.S. Examination receive a certificate in the form entered in the Appendix.

5. In order to pass the Final M.B.B.S. Examination a candidate must pass in Parts I and II of the examination.

In order to pass in Part I of the Final M.B.B.S. Examination a candidate must pass in Group A—Pathology, Bacteriology and Parasitology, in Group B—Preventive and Social Medicine, and in Group C—Forensic and State Medicine.

In order to pass in Part II of the Final M.B.B.S. Examination a candidate must pass in Group A—(i) Medicine, and (ii) Pharmacology and Therapeutics, in Group B—(i) Surgery, (ii) Ophthalmology and Diseases of Ear, Nose and Throat, and in Group C—Obstetrics and Gynaecology and Infant Hygiene.

A candidate who fails to pass either in Part I or in Part II of the Final M.B.B.S. Examination may be re-examined in that part :

Provided that—

A candidate who fails to pass or to appear in one or more groups of Part I of the Final M.B.B.S. Examination may be examined in the group or groups in which he has failed or did not appear, at a subsequent examination.

A candidate who fails to pass or to appear in one or more groups of Part II of the examination, may be examined in the group or groups in which he has failed or did not appear, at a subsequent examination.

The examination shall be completed within a period of nineteen months from the date of appearing in Part II of the Final M.B.B.S. Examination. A candidate will not get any credit for having passed in any group or groups of either part during these nineteen months if he fails to complete the examination within this period.

After this period of nineteen months a candidate will be required to prosecute a further course of study in all subjects of Part II to the satisfaction of the Principal of the College provided that he has already passed in all the groups of Part I.

6. The full marks for each subject and the minimum marks required for passing are as follows :—

*Part I*

	Written marks.	Full Oral Full marks.	Written marks.	Pass Oral Pass marks.	Written and Oral Pass marks.	Practical and Clinical Full marks.	Practical and Clinical Pass marks	Total Full marks	Total Pass marks
Pathology, Bacteriology, and Parasitology.	100	50	..	..	60	50	25	200	100
Preventive and Social Medicine.	100	50	40	20	..	..	..	150	75
Forensic and State Medicine.	100	50	40	20	..	..	..	150	75

*Part II*

	Written marks.	Full Oral Full marks	Written marks.	Pass Oral Pass marks	Written and Oral Pass marks.	Practical and Clinical Full marks.	Practical and Clinical Pass marks.	Total Full marks	Total Pass marks
Medicine .. ..	200	100	..	..	120	200	100	500	250
Pharmacology and Therapeutics.	100	50	40	20	..	..	..	150	75
Surgery .. ..	200	100	..	..	120	200	100	500	250
Ophthalmology and Diseases of Ear, Nose and Throat.	100	50	..	..	60	50	25	200	100
Obstetrics and Gynaecology and Infant Hygiene.	200	100	..	..	120	200	100	500	250

7. During the clinical period, occupying 3rd, 4th and 5th year of study in a medical college, the student shall receive instructions in the subjects of Part I and Part II of the Final M.B.B.S. Examination.

8. The course of study for the Final M.B.B.S. Examination shall be as follows :—

### **PATHOLOGY, BACTERIOLOGY AND PARASITOLOGY**

- (a) Natural history of disease.
- (b) General and Special Pathology and Morbid Anatomy.
- (c) Clinical and Chemical Pathology.
- (d) Elementary general Bacteriology and Parasitology.
- (e) Immunology and Immunisation.
- (f) Practical instruction on the conduct of autopsies as a post-mortem clerk in at least 10 cases.

### **PREVENTIVE AND SOCIAL MEDICINE**

A course of lectures and practical demonstrations dealing with :—

- (1) General concept, physiological hygiene, environmental sanitation including sanitation of fairs, festivals and camps.
- (2) Hygiene—industrial, mental, material and child health, school health.
- (3) Communicable diseases and their control, international health and quarantine.
- (4) Public Health administration, medical statistics, health education.
- (5) Social aspects of disease.

### **FORENSIC AND STATE MEDICINE**

#### *Forensic Medicine :*

A Course of Lectures and practical instructions dealing with :—

- (1) Judicial investigations and Court procedures, medical evidence, medicolegal reports.
- (2) General principles of the characteristics and identity of the living and the dead, medico-legal examination regarding age, death, modes of death, natural and unnatural causes, etc., etc.
- (3) Medico-legal aspects of insanity, mental aberrations and of pregnancy and delivery, etc.
- (4) Toxicology—signs in the living and the dead. Poisons.
- (5) Attendance at not less than 12 Medico-legal Post-mortem Examinations.

#### *State Medicine :*

Practitioners and patients, medical ethics, unprofessional conduct, functions of Medical Councils, etc., etc.



## MEDICINE

A. A course of systematic instruction in the principles and practice of Medicine.

B. During the first three months of the clinical period when the students will not be in charge of beds they will be given instruction on elements of methods of Clinical Examination including Physical signs, the use of common instruments like Stethoscope, Ophthalmoscope, etc., and the examination of body fluids (with demonstration on living subjects—normal and abnormal). Recognition of common bacteria and parasites, their life history and effects on the human system.

C. A medical clinical clerkship for a period of nine months of which six months must be spent in the hospital wards and three months in the out-patient department.

*Note.—It is expected that each student will be given charge of five beds while doing clinical clerkship in the in-patient wards.*

D. A clinical clerkship for two months in a children's ward or hospital, or in an out-patient department.

E. During the period of medical ward-clerking a period of one month as an intern-clerk during which the student is in residence in hospital or close by.

F. Lectures or demonstrations in clinical medicine and attendance in general in-patient and out-patient practice during at least two years which may run concurrently with the surgical practice under Surgery (E).

G. Instruction in Therapeutics and Prescribing.

H. Instruction in Applied Anatomy and Physiology throughout the period of clinical studies, to be arranged between the teachers of Anatomy and Physiology and of the clinical subjects.

I. Instruction throughout the period of medical clerkship in Clinical Pathology, to be arranged between the teachers of Pathology and of the clinical subjects.

J. Instructions in—

Diseases of infants and children.

Acute infectious diseases and tropical diseases.

Tuberculosis.

Psychopathology and mental diseases.

Diseases of the skin including Leprosy.

Radiology and Electrotherapeutics in their application to Medicine.

Theory and practice of vaccination.

*Note.—(1) Throughout the whole period of study the attention of the students should be directed by the teachers of this subject to the importance of its preventive aspects.*

*(2) Instruction in these branches of Medicine should be directed to the attainment of sufficient knowledge to ensure familiarity with the commoner conditions, their recognition and treatment.*

## PHARMACOLOGY AND THERAPEUTICS

- (a) Pharmacological therapeutics.
- (b) Treatment by vaccines and sera.
- (c) Physiotherapy, Chemotherapy and Antibiotics.
- (d) Dietetics.
- (e) Principles of nursing.
- (f) Prescription-writing.
- (g) Practical demonstration of action of drugs on animals and human subjects.

## SURGERY

A. A course of systematic instruction in the principles and practice of Surgery.

B. During the first three months of the clinical period when the students will not be in charge of beds, they will be given instructions on elements of Clinical Examination including Physical signs, the use of common instruments, asepsis and antisepsis, dressing of wounds, etc. Recognition of common bacteria and parasites, their life history and effects on the human system.

C. A Surgical Dressership in the Hospital Wards for a period of nine months, of which six months must be spent in the hospital wards and three months in the out-patient department.

*Note.—It is expected that each student will be given independent charge of five beds while doing Surgical Dressership in the Indoor Wards.*

D. During the period of Surgical Ward Dressing a period of one month as an intern-clerk, during which the student is in residence in hospital or close by.

E. Lectures or demonstrations in clinical surgery and attendance on general in-patient and out-patient practice during at least two years, which may run concurrently with the medical practice under Medicine (F).

F. Practical instruction in surgical methods including physiotherapy.

G. Practical instruction in minor operative surgery on the living.

H. Instruction in the administration of anaesthetics.

I. A course of instruction in Operative Surgery.

J. Instruction in Applied Anatomy and Physiology throughout the period of clinical studies to be arranged between the teachers of Anatomy and Physiology and of the clinical subjects.

K. Instruction throughout the periods of surgical dressership in Clinical Pathology to be arranged between the teachers of Pathology and of the clinical subjects.

**L. Instruction in the following subjects :—**

- (i) Radiology and electrotherapeutics in their application to surgery.
- (ii) Venereal diseases.
- (iii) Orthopaedics.
- (iv) Dental diseases.
- (v) Surgical diseases of infancy and childhood.

*Note.—(1) Throughout the whole period of study the attention of the student should be directed by the teachers of the subject to the importance of its preventive aspects.*

*(2) Instructions in these branches of Surgery should be directed to the attainment of sufficient knowledge to ensure familiarity with the commoner conditions, their recognition and treatment.*

## OPHTHALMOLOGY, AND DISEASES OF EAR, NOSE AND THROAT

Lectures and clinical demonstrations in—

- (i) Ophthalmology, including Refraction and the use of Ophthalmoscope, with hospital attendance for a period of three months.
- (ii) Diseases of ear, nose and throat, including the use of otoscope, laryngoscope and rhinoscope.

## OBSTETRICS AND GYNAECOLOGY AND INFANT HYGIENE

**A.** A course of systematic instruction in the principles and practice of Obstetrics and Gynaecology and Infant Hygiene, including the applied anatomy and physiology of pregnancy and labour.

**B.** Lectures and demonstrations in clinical obstetrics, gynaecology, and infant hygiene and attendance on the practice of a maternity hospital or the maternity wards of a general hospital including (a) ante-natal care and (b) the management of the puerperium, and on in-patient and out-patient gynaecological practice for a period of at least three months.

This period should be devoted exclusively to instruction in these subjects, and should be subsequent to the medical clinical clerkship and the surgical dressership. Not less than two-thirds of the hours of clinical instruction should be given to Midwifery, including ante-natal care and Infant Hygiene.

**C.** Of this period of clinical instruction not less than one month should be spent as a resident pupil either in a maternity hospital or in a hostel attached to a maternity hospital or to the maternity wards of a general hospital.

The students should during this month attend at least twenty cases of labour under adequate supervision. Should the number of cases attended during this month be less than twenty, the remainder must be attended as soon as possible thereafter.

A certificate, showing the number of cases of labour attended by the student in the maternity hospital, should be signed by a responsible Medical Officer on the staff of the hospital and should state—

(i) That the student has personally attended each case during the course of labour, making the necessary abdominal and other examinations under the supervision of the certifying officer who should describe his official position.

(ii) That satisfactory written histories of the cases attended, including, when possible, ante-natal and post-natal observations, were presented by the student and initialled by the supervising officer.

9. The lectures will be as follows :—

Pathology, Bacteriology and Parasitology.	60 lectures or demonstrations.
Preventive and Social Medicine ..	40 Do.
Forensic and State Medicine ..	30
Medicine .. ..	80
Mental Disease .. ..	8
Pharmacology and Therapeutics ..	30 lectures or demonstrations.
Surgery .. ..	80
Ophthalmology and Diseases of Ear, Nose and Throat.	25
(Ophthalmology—15. Diseases of Ear, Nose and Throat—10.)	
Obstetrics and Gynaecology including practical demonstrations and Infant Hygiene.	60

Detailed syllabus in the different subjects will be framed from time to time by the Syndicate on the recommendation of the Board of Studies in Medicine.

*N.B.* The New Regulations are to take effect from the examination of April, 1952.

## CHAPTER XLVI

### INSTRUCTION AFTER PASSING FINAL M.B.B.S. EXAMINATION

A student after having successfully passed the Final M.B.B.S. Examinations in Part I and Part II is required to attend a course of six months' practical clinical instruction in the wards of a hospital specially recognised for the purpose.

A part, not exceeding one month of the above-mentioned period, may be spent in a hospital for special diseases.

The hours of attendance at the hospital should not be less than an average of 18 hours per week.

On completion of the course of practical clinical instruction, the student shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate, for admission to the M.B.B.S. Degree and the Syndicate on being satisfied that he is qualified for admission to the degree shall cause his name to be published in the *Gazette*. He shall, thereupon, receive with his Degree of M.B.B.S. a certificate in the form given in Appendix A.

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## CHAPTER XLVI-A

### TRANSITORY REGULATIONS

#### M.B. EXAMINATIONS

1. In this Chapter, the phrase " new Regulations " shall be taken to mean the present body of Regulations.

The phrases " old Regulations " and " old Rules " shall be taken to refer respectively to the Regulations and Rules in operation on the date previous to that on which the new Regulations come into force.

2. Candidates, who pass the Preliminary Scientific, First, Second and Third M.B. Examinations under the old Regulations, may prosecute further studies under the new Regulations in accordance with the following scheme:—

##### (a) *Preliminary Scientific M.B. Examination*

Any candidate, who will come out successful at this examination, may appear at the First M.B. Examination under the new Regulations, provided he attends in an affiliated college a regular course of lectures for two academical years in the prescribed subjects.

Such candidates will be exempted from appearing in Organic and Physical Chemistry at the First M.B. Examination.

##### (b) *First M.B. Examination*

Any candidate, who will come out successful at the First M.B. Examination under the old Regulations, may appear at the Final M.B. Examination under the new Regulations provided he attends in an affiliated college a regular course of studies for three academical years in the prescribed subjects and provided further he passes in Pharmacology at the First M.B. Examination under the new Regulations before he appears for the Final M.B. Examination.

##### (c) *Second M.B. Examination*

Any candidate, who will come out successful at the Second M.B. Examination under the old Regulations, may appear at the Final M.B.B.S. Examination under the new Regulations, provided he attends in an affiliated college a regular course of studies for two academical years in the prescribed subjects.

Such candidates will be exempted from appearing in (1) Pharmacology and Therapeutics and (2) Pathology, Bacteriology and Parasitology at the Final M.B. Examination in Part I, under the new Regulations.

(d) *Third M.B. Examination*

Any candidate, who will come out successful at the Third M.B. Examination under the old Regulations, may appear at the Final M.B.B.S. Examination under the new Regulations, provided he attends in an affiliated college a regular course of studies for one academical year in the prescribed subjects.

Such candidates will be exempted from appearing in—

- (i) Pathology, Bacteriology and Parasitology.
- (ii) Pharmacology and Therapeutics.
- (iii) Public Health and Hygiene, and
- (iv) Forensic and State Medicine,

at the Final M.B.B.S. Examination in Part I, under the new Regulations.

3. Candidates, who are unsuccessful at the Preliminary Scientific, First, Second and Third M.B. Examinations under the old Regulations, may prosecute further studies under the new Regulations on fulfilling the conditions as noted below :—

(a) Any candidate, who fails at the Preliminary Scientific M.B. Examination under the old Regulations, may appear at the First M.B.B.S. Examination under the new Regulations, provided he attends in an affiliated college a regular course of lectures for two academical years in the prescribed subjects, provided further that he passes before appearing at the First M.B.B.S. Examination the practical test of the I.Sc. Examination of this University in those scientific subjects (excluding Mathematics) in which he had passed at the I.Sc. Examination before admission to a Medical College : provided also that he similarly passes in a Biological subject, both theoretical and practical, as required under section 1 (a) of Chapter XLIV unless he had previously passed in the theoretical portion of such Biological subject at the I.Sc. Examination.

(b) Any candidate, who fails in the First M.B. Examination under the old Regulations, may appear at the First M.B.B.S. Examination under the new Regulations, provided he attends in an affiliated college a regular course of studies for one academical year in the prescribed subjects.

Such a candidate will be exempted from appearing in Organic and Physical Chemistry at the First M.B.B.S. Examination.

(c) Any candidate, who fails in the Second M.B. Examination under the old Regulations, may appear at the Final M.B.B.S. Examination under the new Regulations, provided he attends in an affiliated college a regular course of studies for three aca-

demical years in the prescribed subjects and provided further he passes in Pharmacology at the First M.B. Examination under the new Regulations before appearing at the Final M.B.B.S. Examination under the new Regulations.

(d) Any candidate, who fails in the Third M.B. Examination under the old Regulations, may appear at the Final M.B.B.S. Examination under the new Regulations, provided he attends in an affiliated college a regular course of studies for two academical years in the prescribed subjects.

Such a candidate will be exempted from appearing in Pathology, Bacteriology and Parasitology at the Final M.B.B.S. Examination, Part I, under the new Regulations.

4. Candidates, prosecuting studies under the old Regulations in 1939-40, may continue further studies under the old Regulations, and appear at the examinations under the old Regulations, to be held in the years noted below :—

(a) The Preliminary Scientific M.B. Examination, in accordance with the old Regulations and Rules, shall be held for the last time in November 1941, and for this purpose these Regulations and Rules shall be deemed to be in force.

(b) The First M.B. Examination shall be held for the last time in April, 1945, in accordance with the old Regulations and Rules, which, for this purpose, shall be deemed to be in force.

(c) The Second M.B. Examination shall be held for the last time in November, 1947, in accordance with the old Regulations and Rules, which, for this purpose, shall be deemed to be in force.

(d) The Third M.B. Examination shall be held for the last time in April, 1950, in accordance with the old Regulations and Rules, which, for this purpose, shall be deemed to be in force.

(e) The Final M.B.B.S. Examination shall be held for the last time in November, 1952, in accordance with the old Regulations and Rules, which, for this purpose, shall be deemed to be in force.

5. Candidates who will appear at the various M.B. Examinations under the old Regulations during the transitory period will be required to attend lectures, theoretical and practical, the number of which will not exceed that prescribed under the new Regulations.

6. The Syndicate may pass orders for meeting special cases during the transitory period which may not be directly covered under the above Regulations.

7. The Rules and Regulations relating to the M.B.B.S. Examinations now in force shall remain operative subject to such modifications contained in this chapter.



## RULES RELATING TO THE NEW M.B.B.S. EXAMINATIONS

I. The New Regulations will come into force with effect from June, 1940, subject to the provisions of the Transitory Regulations as outlined embodied in the Regulations as Chapter XLVI-A.

II. Chapter XLVI will come into force with effect from 1945 and will be applicable for the first time for those students who take their admission from June, 1940.

III. No student under the old M.B. Regulations once choosing to come under the new Regulations shall be allowed to revert to the old Regulations again.

IV. The Transitory Regulations will be applicable to the following classes of candidates :—

A. Those who will appear at the Preliminary Scientific, First, Second and Third M.B. Examinations in 1940 and are successful at such Examinations.

Such candidates will be given the option of continuing their studies (i) under the new Regulations or (ii) under the old Regulations.

B. Those who appear at the Preliminary, First, Second Third and Final M.B. Examinations in 1940, but are unsuccessful.

Such candidates will also be given the option of proceeding (i) under the new Regulations or (ii) under the old Regulations.

The Preliminary Scientific M.B., First M.B., Second M.B., Third M.B. and Final M.B.B.S. Examinations, under the old Regulations, will be held for the last time, respectively, in November, 1941, April, 1945, November, 1947, April, 1950, and November, 1952.

V. In order to facilitate holding of classes, theoretical and practical at the Medical colleges candidates who will appear under the old Regulations during the transitory period will attend the same number of lectures, theoretical and practical, as is prescribed under the new Regulations.

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## CHAPTER XLVI-B

The following classes of candidates will be permitted to appear at the Final M.B.B.S. Examination as non-collegiate students during the period of the War and three years thereafter on their fulfilling the conditions stated below :—

1. (a) A candidate who holds a License or a Diploma granted by an Examining Body in British India (other than the Universities) registerable under any of the Provincial Medical Council Acts and who has also passed the Matriculation Examination of this University or an Examination equivalent thereto or the Cambridge School Certificate Examination, provided that such a certificate shows that the candidate has passed at one and the same Examination in the following subjects :—

- (i) English Language or Literature.
- (ii) Mathematics (Elementary or Additional).
- (iii) A language other than English.
- (iv) Any other subject (except Religious Knowledge) mentioned in Groups I, II and III of the syllabus for such School Certificate Examination.

(b) A candidate who has held a Commission as a Medical Officer in His Majesty's Indian Army and applies for facilities for appearing at the M.B.B.S. Examination within 3 years, after demobilisation, may be exempted from the operation of Section I of Chapter XLIV of the Regulations prescribing the preliminary qualification regarding general education, if, previous to commencing the study of medicine for the acquisition of qualifications registerable under the Provincial Medical Council Acts, he had passed an Examination in general education with Mathematics (Arithmetic, Algebra and Geometry) of the Matriculation standard.

2. Such a candidate must produce a certificate from the Principal of the college affiliated in Medicine to the University up to the Final M.B.B.S. standard to the effect that he has attended, in such a college for a period of at least six months, a course of instruction in the following subjects :—

Anatomy, Physiology, Materia Medica, Pharmacology including Bio-Chemistry.

3. He must also produce a certificate from the Principal of the college concerned of having attended for a period of not less than 24 months a course of studies in the subjects enunciated in Parts I and II under Regulation 3 of Chapter XLV:

Provided that the holder of any Diploma registerable under the Provincial Medical Council Acts, who had pursued medical

studies for a period of at least 5 years, will be exempted from the course of instruction contemplated in (2) above and will be given concessions of six months in the period of 24 months' study mentioned in this Section :

Provided further that a Licentiate Officer of the I.A.M.C. who had received 3 months' intensive training at the Army Medical Training Centre at Poona and passed the Examination held after the course, will also be given concession of six months in the period of training mentioned in this Section.

4. He must have spent during this period of studies contemplated in (3) above, not less than 12 months or one academic year in clinical studies.

5. The provisions of the Regulations Nos. 2, 3, 4, 5 and 6 of Chapter XLV shall be applicable to him.

6. Every candidate shall, after passing the Final M.B.B.S. Examination in Parts I and II, receive with his Degree of M.B.B.S. a certificate mentioned in Chapter XLVI of the Regulations.

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## CHAPTER XLVII

### DOCTOR OF MEDICINE

1. An examination for the Degree of Doctor of Medicine shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine and Surgery may be admitted to this Examination on the production of certificates—

Of having subsequently to passing the M.B.B.S. Examination, completed, either three years' continuous practice of the Medical profession or two years of Hospital practice.

Each of these periods shall be reduced by one year if the candidate be a Graduate with Honours in Medicine.

No application shall, however, be entertained unless two members of the Faculty of Medicine or two Doctors in any Faculty of this University or of a University approved by the Syndicate from time to time shall have testified, to the satisfaction of the Syndicate, that since graduating as Bachelor of Medicine and Surgery the candidate has practised his profession with repute for the period specified, and that, in habits and character, he is a fit and proper person for the Degree of Doctor.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 300, at least two months before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of three hundred rupees on each occasion.

5. Every candidate shall be examined in the following subjects :—

Medicine (two papers, of which one may be a case for commentary).

Pathology (one paper).

Mental Diseases (one paper).

The examination shall be written, oral and practical, and shall also include a thesis.

6. A candidate for the Degree of Doctor of Medicine shall transmit to the Registrar not less than two months before the

commencement of the examination a thesis or published work embodying the result of independent research and having definite relation to the subjects of Medicine, Pathology or Mental Diseases. The candidate must indicate in what respects his thesis or research appears to him to advance medical knowledge or practice. The candidate may also submit any printed contribution or contributions to the advancement of Medical Science published independently or conjointly.

If the thesis or published work is approved by the Examiners, they will report on the same as "commended" or "highly commended." Unless the thesis is commended, the candidate shall not be admitted to the examination.

7. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order with the titles of their theses and the opinions of the Examiners thereon placed against the name of each candidate. If in the the opinion of the Examiners, sufficient merit be evinced, a University gold medal shall be awarded to the candidate passing with the greatest distinction.

8. Any candidate who is not a Bachelor of Medicine and Surgery may be admitted to the examination for the Degree of Doctor of Medicine in accordance with the conditions laid down in Regulations 5 and 6 and on producing certificates —

- (a) of having passed the Licentiate Examination in Medicine and Surgery of the University ;
  - (b) of having passed the examination in Zoology required for the Preliminary Scientific M.B. Examination ;
  - (c) of having practised the Medical profession with repute for the period specified ;
  - (d) of being in habits and character a fit and proper person for the Degree of Doctor.
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## CHAPTER XLVIII

### MASTER OF SURGERY

1. An examination for the Degree of Master of Surgery shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine and Surgery may be admitted to this examination on production of certificates of having subsequently to passing the M.B.B.S. Examination, completed—

either three years' continuous practice of the Medical profession ;

or two years of hospital practice.

Each of these periods shall be reduced by one year if the candidate be a Graduate in Medicine with Honours in Surgery.

No application shall, however, be entertained unless two members of the Faculty of Medicine or two Masters of Surgery shall have testified, to the satisfaction of the Syndicate, that since graduating as Bachelor of Medicine and Surgery the candidate has practised his profession with repute for the period specified, and that, in habits and character, he is a fit and proper person for the Degree of Master.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 300 at least two months before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of three hundred rupees on each occasion.

5. Every candidate shall be examined in the following subjects :—

- (1) Surgery (two papers, one of which may be a case for commentary).
- (2) Surgical Pathology and Surgical Anatomy (one paper).
- (3) Ophthalmology or any other branch of special Surgery that may be recognised by the University from time to time (one paper).
- (4) Operative Surgery and the use of instruments.

The examination shall be written, oral and practical.

6. A candidate for the Degree of Master of Surgery shall transmit to the Registrar, no less than two months before the commencement of the examination, a thesis or published work embodying the result of independent research and having definite relation to Surgery. The candidate must indicate in what respects his thesis or research appears to him to advance surgical knowledge or practice. The candidate may also submit any printed contribution or contributions tending to the advancement of Medical Science published independently or conjointly.

If the thesis or published work be approved by the Examiners, they will report on the same as "commended" or "highly commended". Unless the thesis is commended, the candidate shall not be admitted to the examination.

7. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order, with the titles of their theses and the opinions of the Examiners thereon placed against the name of each candidate. If, in the opinion of the Examiners, sufficient merit be evinced, a University gold medal shall be awarded to the candidate passing with the greatest distinction.

8. Any candidate who is not a Bachelor of Medicine and Surgery may be admitted to the examination for the Degree of Master of Surgery, in accordance with the conditions laid down in Regulations 5 and 6 on producing certificates to the following effect—

- (a) of having passed the Licentiate Examination in Medicine and Surgery of the University ;
  - (b) of having passed the examination in Zoology required for the Preliminary Scientific M.B. Examination ;
  - (c) of having practised the Medical profession with repute for the period specified ;
  - (d) of being in habits and character a fit and proper person for the Degree of Master of Surgery.
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## CHAPTER XLIX

### MASTER OF OBSTETRICS

1. An examination for the Degree of Master of Obstetrics shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine and Surgery may be admitted to this examination, provided he shall produce certificates to the following effect :—

- (a) of having, subsequent to passing the M.B.B.S. Examination, attended during a period of six months a course of clinical instruction in a recognised hospital or ward specially devoted to the treatment of Obstetric and Gynaecological cases ;
- (b) of having, subsequent to passing the M.B.B.S. Examination, had personal charge at least twenty cases of labour, a record of which must be submitted ;
- (c) of having, subsequently to passing the M.B.B.S. Examination, completed—

either three years' continuous practice of the Medical profession,

or two years of hospital practice.

If the candidate be a Graduate in Medicine with Honours in Midwifery, each of these periods shall be reduced by one year.

No application shall, however, be entertained unless two Members of the Faculty of Medicine or two Masters of Obstetrics shall have testified, to the satisfaction of the Syndicate, that since graduating as Bachelor of Medicine and Surgery the candidate has practised his profession with repute for the period specified and that in habits and character he is a fit and proper person for the Degree of Master.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 300 at least two months before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of three hundred rupees on each occasion.



5. Every candidate shall be examined in the following subjects :—

- (1) Obstetrics (two papers, one of which may be a case for commentary).
- (2) Anatomy, Physiology, Embryology and Pathology in relation to Obstetrics and Gynaecology (one paper).
- (3) Gynaecology (one paper).
- (4) Operative Gynaecology and the use of instruments.

The examination shall be written, oral and practical.

6. A candidate for the Degree of Master of Obstetrics shall transmit to the Registrar, not less than two months before the commencement of the examination, a thesis or published work embodying the result of independent research and having definite relation to Obstetrics or Gynaecology. The candidate must indicate in what respects his thesis or research appears to him to advance Obstetric or Gynaecological knowledge or practice. The candidate may also submit any printed contribution or contributions tending to the advancement of Medical Science published independently or conjointly.

If the thesis or published work be approved by the Examiners they will report on the same as "commended" or "highly commended". Unless the thesis is commended, the candidate shall not be admitted to the examination.

7. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order, with the titles of their theses and the opinions of the examiners thereon placed against the name of each candidate. If, in the opinion of the examiners, sufficient merit be evinced, a University gold medal shall be awarded to the candidate who shall pass with the greatest distinction.

8. Any candidate who is not a Bachelor of Medicine and Surgery may be admitted to the Examination for the Degree of Master of Obstetrics in accordance with the conditions laid down in Regulations 5 and 6, on producing certificates to the following effect :—

- (a) of having passed the Licentiate Examination in Medicine and Surgery of the University ;
- (b) of having passed the Examination in Zoology required for the Preliminary Scientific M.B. Examination ;
- (c) of having practised the Medical profession with repute for the period specified ;
- (d) of having, subsequent to passing the Licentiate Examination in Medicine and Surgery, attended during a period of six months a course of clinical instruction in a recognised hospital or ward specially devoted to the treatment of Obstetric and Gynaecological cases ;

- (e) of having, subsequent to passing the Licentiate Examination in Medicine and Surgery, had personal charge of at least twenty cases of labour, a record of which must be submitted ;
  - (f) of being in habits and character a fit and proper person for the Degree of Master of Obstetrics.
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## CHAPTER XLIX-A

### DIPLOMA IN OPHTHALMIC MEDICINE AND SURGERY

1. An examination for a Diploma in Ophthalmic Medicine and Surgery shall be held twice every year in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

The examination shall be divided into two parts, Part I and Part II, as defined below in Section 5.

2. Any Bachelor of Medicine and Surgery or Licentiate in Medicine and Surgery may be admitted to this examination on production of certificates of having, subsequent to passing the M.B.B.S. or L.M.S. Examination,—

(i) received instructions in the following subjects at an institution recognised for the purpose by the University from teachers approved by the University :—

- (a) Anatomy and Embryology of the Visual apparatus including the contents of the Orbit, the bones in the neighbourhood thereof, and the central nervous system so far as it is related to vision.
- (b) Physiology of Vision.
- (c) Elementary Optics.
- (d) Optical defects of the Eye.
- (e) Ophthalmic Medicine and Surgery.
- (f) Pathology with special reference to Medicine and Surgical Ophthalmology.

(ii) Attended the clinical and practical work in a recognised Ophthalmic Hospital or the Ophthalmic Department of a General Hospital having at least 20 Ophthalmic beds, for at least eighteen months of which six months should be devoted to Refraction work. During this period he must be engaged in the study of Ophthalmology in relation to General Medicine and Surgery. The conditions of the certificate will be fulfilled by holding the appointment as House Surgeon, House Physician, Clinical Assistant, Tutor or a Post-Graduate student or scholar in a recognised Ophthalmic Hospital.

(iii) Attended a practical course of operations in Ophthalmic Surgery.

(iv) Attended a practical course of Pathology and Bacteriology with special reference to Ophthalmology.

(v) Has been engaged in the Post-Graduate study of Ophthalmology for not less than two years at a recognised institution :

Provided that a candidate may appear in Part I (but not in Part II) of the examination on the completion of a year of training ; provided also that a candidate may not appear in Part II until he has passed in Part I of the examination.

3. Every candidate for admission to each part of the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 100 at least one month before the date fixed for examination.

4. A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of the prescribed fee on each occasion.

5. Every candidate shall be examined in the following subjects :—

#### PART I

- (a) Anatomy of the Eye .. .. . *One Paper.*  
 (b) Physiology and Elementary Optics .. .. .

#### PART II

- (a) Ophthalmic Medicine and Surgery including Optical defects. .. .. . *One Paper.*  
 (b) Relations of Ophthalmology to General Medicine and Surgery. .. .. .  
 (c) Pathology and Bacteriology with reference to Ophthalmology. .. .. .

The examination shall be written, oral, clinical and practical.

6. The full marks for each subject and minimum marks required for passing shall be as follows :—

#### PART I

	Written	Oral and practical	Total	Passing marks
(a) Anatomy of the Eye ..	100	100	200	100
(b) Physiology and Elementary Optics.	100	100	200	100

## PART II

	Written	Oral	Clinical and Practical	Total	Passing marks	Passing marks, Written and Oral	Passing marks, Clinical and Practical
(a) Ophthalmic Medicine and Surgery including Optical defects.	100	..	200	400	200	100	100
(b) Relation of Ophthalmology to General Medicine and Surgery.	100	100	100	300	150	100	50
(c) Pathology and Bacteriology with reference to Ophthalmology.	100	100	100	300	150	100	50

## CHAPTER XLIX-B

### DIPLOMA IN GYNÆCOLOGY AND OBSTETRICS

1. An examination for a Diploma in Obstetrics and Gynæcology shall be held in Calcutta twice annually at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine and Surgery or Licentiate in Medicine and Surgery may be admitted to this examination on production of certificates of having, subsequent to passing the M.B.B.S. or L.M.S. Examination (or an examination equivalent thereto) of a University in British India,

(a) Served as a House Surgeon for at least six months in an Obstetrics and Gynæcological Hospital or the Obstetric and Gynæcological Departments of a General Hospital recognised for this purpose and subsequent to this

(b) Attended for a period of one year in a recognised institution a course of 40 lectures and 40 demonstrations in the following subjects :—

Practice of Midwifery.  
Practice of Gynæcology.  
Anatomy of Female Pelvis.  
Elementary Embryology.  
Pathology of Female Organs.  
Ante-Natal Pathology.

(c) And personally performed during this period not less than six obstetrical operations and conducted at least ten labour cases under the supervision of the medical staff of the recognised institution.

In case the requirement laid down in Section 2(a) is not fulfilled, the candidate will have to attend lectures and demonstrations in a recognised institution for an additional period of six months in the subjects enumerated under Section 2(b).

3. Each candidate for admission to the examination shall send in his application to the Registrar, with a certificate in the form prescribed and a fee of Rs. 100, at least one month before the date fixed for the examination.

4. A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of the prescribed fee on each occasion.

5. Every candidate shall be examined in the following subjects :—

- (1) Obstetrics .. .. . *One Paper.*  
 (2) Gynæcology and Diseases of a New-born Child. *One Paper.*

A Clinical and Oral examination in Obstetrics and Gynæcology shall be held.

The examination is specially intended to test the students' knowledge of the practical side of Obstetrics and Gynæcology.

6. The full marks for each subject shall be as follows :—

	Written	Oral	Clinical
Obstetrics	100	100	200
Gynæcology and Diseases of the New-born Child	100	100	200

A candidate obtaining 50 per cent. of marks in the Written and Oral portions combined and 50 per cent. in the Clinical shall be deemed to have passed the examination.

7. As soon as possible after the examination the Syndicate shall publish a list of successful candidates arranged in order of merit. Each successful candidate shall be given a Diploma in the form prescribed in Appendix 'A'.

## CHAPTER XLIX-C

### DIPLOMA IN MATERNITY AND CHILD WELFARE

1. An examination for a Diploma in Maternity and Child Welfare shall be held once in every year in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine and Surgery or Licentiate in Medicine and Surgery may be admitted to the examination on production of certificates of having, subsequent to passing the M.B.B.S. or L.M.S. Examination,

(i) Attended in an approved institution a course of instruction of not less than 360 hours in :—

- (a) Preventive Pediatrics, (b) Preventive Obstetrics, (c) Child Psychology, (d) Physiological Hygiene and Nutrition.

(ii) Attended in the approved institution a course of instruction of not less than 200 hours in :—

- (a) The principles of environmental hygiene and public health engineering, (b) epidemiology and vital statistics (including statistical method), (c) public health law and administration (including social security, public medical service and hospital administration and personal health services), (d) industrial hygiene and the principles of genetics in relation to public health.

(iii) Been engaged during a period of not less than six months in acquiring a practical knowledge of the duties, routine and special, of public health administration under the supervision of a Medical Officer of Health, who shall certify that the candidate has received, from this officer or other competent officer, during not less than 3 hours on each of 60 working days, practical instruction in these duties, including those of :—

- (a) Maternity and infant welfare services, (b) health services for young children and children of school age, (c) venereal disease service, (d) tuberculosis service, (e) industrial hygiene, (f) hospital services, (g) mental health services, (h) inspection and control of food, including meat and milk.

*Note.*—Instructions in the matters specified under the foregoing heads, (a) to (h) should include attendance at the centres, clinics, institutions and premises concerned.

Emphasis during this part of the curriculum will be placed in the organisation of the maternal and child health and school health services, the duties of the Medical Officer for Maternity and Child Welfare, on industrial hygiene relating



to women and children in industry, on the planning of homes, maternity and children's hospitals, creches, nursery schools, etc.

- (iv) Completed eight attendances of two hours each at a recognised Infectious Diseases Hospital or Hospitals or at the Infectious Diseases Ward of a General Hospital or Hospitals.

(v) Practised the medical profession for a continuous period of one year and a half which may include the period of training specified above.

3. Every candidate for admission to the examination shall send in his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 100 at least one month before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of Rs. 50 on each occasion but he will have to appear in all the subjects for the examination.

5. Every candidate shall be examined in the following subjects :—

(a) Preventive Obstetrics, Preventive Pediatrics, Child Psychology.

(b) Physiological Hygiene and Nutrition.

(c) Environmental Hygiene, Public Health Law and Administration.

(d) Organisation of the Maternity and Child Health and School Health Services.

6. The examination shall be Written, Oral and Practical and the full marks for each subject and the minimum marks required for passing shall be as follows :—

	WRITTEN		ORAL AND PRACTICAL		Total Passing Marks
	Total Marks	Passing Marks	Total Marks	Passing Marks	
(a) Preventive Obstetrics, Preventive Pediatrics, Child Psychology.	50	25	50	25	50
(b) Physiological Hygiene and Nutrition.	50	25	50	25	50
(c) Environmental Hygiene, Public Health Law and Administration.	50	25	50	25	50
(d) Organisation of the Maternity and Child Health and School Health Services.	50	25	50	25	50

7. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order. If, in the opinion of the Examiner, sufficient merit be evinced, a University gold medal will be awarded to the candidate who shall have passed with the greatest distinction.

8. The limits of the subjects for the examination and study shall be as follows :—

*Preventive Obstetrics :—*

Maternal Mortality and Morbidity—Socio-economic, psychological, environmental, personal, clinical and other factors influencing mortality and morbidity.

Foetal, intranatal and neonatal mortality. Influencing factors.

Objectives of prenatal care : causes of failure to achieve objectives. Nature, scope and standards for prenatal care.

Hygiene of pregnancy—optimum requirements for health, Mental hygiene of pregnancy.

Minor disorder and diseases—pyorrhoea, backache, abdominal pains, deficiency diseases.

Prevention of puerperal sepsis, anaemias, toxemias.

Pregnancy complicated by tuberculosis, venereal diseases.

Family planning.

*Preventive Pediatrics :—*

Infant Mortality and Morbidity—Socio-economic, psychological, environmental, personal, clinical and other factors influencing rates.

Objectives and standards for infant and child care—Nature, scope and method of examination of infants and young children. Growth and development of the infant.

Infant Hygiene.

Breast feeding—Establishment and management, minor disturbances in the breast fed.

Artificial feeding.

Growth and development of the preschool child.

Child Hygiene and management.

*Physiological Hygiene :—*

40 hours are spent in Theoretical and Practical instructions. The Syllabus for the Theoretical portion includes :—

The phenomenon of life ; its Physico-Chemical basis ; beginnings ; evolution plant and animal life.

The span of life, prolongation and rejuvenescence.

Health, heredity, endocrines and environment.

Geographical environment and climate.

Urban and rural environments ; their influence on the physical condition, impairment of health, and the incidence of disease.

Economic status ; low incomes in relation to health.

Social environment, habits and customs, marriages, sex hygiene, pregnancies, food habits and personal hygiene.

Occupational environment; agriculture; industry; smoke, dust and gas pollution of air.

Energy exchanges, effect of climatic and other environmental changes on health, man in hot, dry and humid atmosphere.

Tropical climate, mechanism of heat loss, perspiration, physical efficiency in tropics.

Clothing in relation to climate with particular reference to tropics.

Physiology of ventilation and air conditioning.

Influence of altitude, life on hills and mines.

Aviation, submarine and diving problems.

Effects of noise and vibration, detection and prevention of deafness.

Radiation, infra-red, visible, ultra-violet, their physiological effects, illumination and hygiene of the eye, heat-stroke and sun-stroke.

Muscular exertion, amount in different occupations and their effect on health, exercise for health, assessment of physical fitness.

The syllabus for the practical work includes :—

Determination of basal metabolism.

Estimation of work and total metabolism, cycle ergometer.

Determination of fatigue, method of production and determination of onset.

Methods of determining temperature and humidity, use of wet and dry bulb thermometers and hygrometers.

Methods of measuring conditions of comfort, use of Kata thermometer.

Barometric pressure and its effects on respiration.

Study of radiation, photometric measurement of natural and artificial light in schools, factories, etc.

Detection and estimation of atmospheric pollution, gases, etc.

First aid in drowning, electric shock and gas poisoning.

Perspiration, determining efficiency of clothing.

[ There are 10 classes of 2 hours each. ]

*Nutrition* :—

Both theoretical and practical instructions are given. A total of 40 hours are spent; 20 for theoretical and 20 for practical. The syllabus for the theoretical portion includes :—

The problem of nutrition and its importance in public health with special reference to Indian conditions; historical development of knowledge of nutrition and the discovery of the accessory food factors.

Basal and total metabolism; calories; food requirement according to age, growth, etc.

Carbohydrates, fats, proteins and their functions as food.

Protein requirement of man ; its determination.

Vitamins, their nature, functions, optimum requirements, and effects of deficiency.

Minerals, Ca, P, I, Fe ; their importance in nutrition.

The role of trace elements Cu, Cr, Co, etc., in nutrition.

Balanced diets for infants, children, pregnant and lactating women.

Assessment of state of nutrition ; application to nutrition surveys.

Investigation of dietary habits of people, suggestions for improvements.

Field nutrition experiments.

Socio-economic factors in nutrition ; Relation of agriculture to food production and nutrition of the people.

Nutrition propaganda.

The syllabus for the practical work includes :—

Determination of calories, proximate principles, vitamins, minerals of diets from food analysis tables.

Planning of balanced diets according to age, work, physiological state, *e.g.*, pregnancy and lactation, for schools, institutions, etc.

Nitrogen balance and protein requirements.

Assessment of nutrition, anthropometric and clinical.

Detection of Vitamin A deficiencies, clinical, physiological photometric dark adaption, etc.

Assessment of Vitamin B nutrition fluoroscopy of urine.

Vitamin C subnutrition and urine saturation test.

Blood phosphatase test ; relation to bone and teeth formation.

Nutrition surveys in an institution ; suggestion for improvements.

Dietary survey in the field ; constructive criticism of food habits.

[ There are 10 classes of 2 hours each. ]

### *Environmental Hygiene, Public Health Law and Administration—*

The principles and practice of personal, communal, international and occupational Hygiene. Elementary general geology especially in relation to Hygiene and Public Health. The effect of climate, environment and food on human organisms and community. Water and Water supplies. Water purification and disinfection. Water borne diseases. The study of the atmosphere in its relation to health and disease, ventilation of towns, houses and buildings ; the cause and effects of vitiation of the atmosphere, the planning of towns, villages, houses, factories and barracks.

The effects of soil on health, building sites. The collection and disposal of refuse and excretal matter.

The control and prevention of infectious diseases by isolation, disinfection, vaccination, etc., with special reference to small pox, cholera, plague and other tropical diseases. Industrial Hygiene, the special diseases of occupation, causation, their detection and prevention.

The development of public health administration and organisation, Central and Provincial and their socio-economic implications with particular reference to India. General sanitary Law with particular reference to Indian Acts. The history of Sanitary Law and administration in England, India and other countries. The present system of Sanitary Administration in India. Forms of local government and their relation to public health and sanitation. The Sanitary Laws and enactments of Great Britain and India. The duties of Health Officers with particular reference to Maternity and Child Welfare. *Maternity and Child Welfare Organisation—*

History and present position.

Introduction—Relationship of M. and C. W. services to general health services.

Complete schemes for M. and C. W.—Physical facilities, personnel.

Institutional Midwifery.

Domiciliary Midwifery.

Health Centres—Prenatal, Postnatal, Infant and Child consultation clinics.

Local, regional and provincial organisation of M. and C. W.

Auxiliary services—Creches, Nursery schools, care of handicapped child.

Care of the Mother and Child in industry.

Legislation relating to M. and C. H.

Records, Inspection notes, Reports, Committee procedure.

Supervision of Staff—Principles and objectives, function of supervisor, staff education and Conference technique, individual and groups.

Evaluation of work of staff—Personal assessment—Reports.

Activity and Progress reports.

*School Health—*

History and present position—Relationship to general health.

Growth and Development of school child.

Physical examination of School children—Standards of care.

Nature of defects—Found on Medical inspection—Prevention, control and treatment.

Health education practice in school.

Environmental hygiene in the school—Buildings and Equipment.

Education of the handicapped child.

Organisation of the school health services.

Legislation.

## CHAPTER XLIX-D

### DIPLOMA IN TUBERCULOUS DISEASES

1. An examination for a Tuberculous Diseases Diploma (T.D.D.), shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine and Surgery, or Licentiate in Medicine and Surgery, may be admitted to this examination on production of certificates of having, subsequent to his passing the M.B.B.S. or L.M.S. Examination—

(i) received for a period of nine months, instructions, theoretical and practical, according to the syllabus laid down in Section 7 below, in an institution recognised for the purpose by the University from teachers approved by the University therefor ;

(ii) attended for a period of not less than 125 hours during this period of nine months' practical classes in—

(a) Pathology and Bacteriology of Tuberculosis,

(b) Applications of Radiology in Tuberculosis,

(c) Methods of differential diagnosis and therapy of Tuberculosis,

(d) Public Health aspects of Tuberculosis ;

(iii) attended the Tuberculosis Department of a Hospital or the Clinical wards of a Tuberculosis Hospital, recognised by the University, for a period of three hours on all working days ;

(iv) completed *either* two years' continuous practice of the medical profession, *or* six months' Hospital practice as a member of the House Staff of a Hospital recognised by the University for the purpose.

3. Every candidate for admission to the examination shall send in his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 50, at least one month before the date of the examination.

4. Every candidate shall be examined in the following subjects :—

(a) Pulmonary Tuberculosis, including its epidemiology, pathology, bacteriology, symptomatology, differential diagnosis, treatment, after-care, prevention and method of survey .. .. . *One Paper.*

(b) Non-pulmonary Tuberculosis including glandular, osteo-articular, cutaneous, ocular, laryngeal, intestinal, genito-urinary and other localisations .. .. . *One Paper.*

The examination shall be Written, Oral and Practical. The Practical examination shall include a clinical test on a pulmonary and a non-pulmonary case.

The Examination shall be held twice a year on such dates as the Syndicate may specify.

5. The full marks for each subject and minimum marks required for passing shall be as follows :—

Subject	Written		Oral		Clinical and Practical		Total	Passing Marks
	Written	Passing Marks	Oral	Passing Marks	Clinical and Practical	Passing Marks		
Pulmonary Tuberculosis	100	40	100	40	100	50	300	150
Non-pulmonary Tuberculosis	100	40	100	40	100	50	300	150

6. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee. He may be admitted to the subsequent examination or examinations at the end of six months from the examination at which he failed or did not appear, on payment of a like fee of Rs. 50 on each occasion, on production of a certificate from the Head of a Tuberculosis Clinic and/or Hospital or Sanatorium recognised for the purpose by the University to the effect that the candidate has continued to pursue practical training in the prescribed subjects to the satisfaction of the University.

7. After having passed the examination a candidate will be required to work as a Clinical Assistant under a recognised teacher for a period of three months in a Tuberculosis Clinic or Hospital or Sanatorium specially recognised for the purpose. On completion of this period the candidate shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate for the grant of the Diploma and the Syndicate, on being satisfied that he is qualified for the Diploma, shall cause his name to be published in the *Gazette*. He shall thereupon receive the Diploma in the form prescribed in Appendix A.

8. The Course of study for the examination shall be as follows :—

*Theoretical (75 lectures)*

*Introductory (1 lecture)—*

Tuberculosis in men and animals.

*Bacteriology of Tuberculosis (2 lectures)—*

Types of bacilli—their characters, methods of differentiation and pathogenicity. Chemistry of the tubercle bacillus.

*Pathology of Tuberculosis (5 lectures)—*

Modes of infection. Primary infection and the tissue changes; fate of the primary infection. The tuberculin reaction. Changes in the human body after infection, or the immunological phenomenon—allergy.

Re-infection and tissue changes—formation of tubercle, secondary changes, caseation and liquefaction. Endogenous *vs* Exogenous re infection.

The process of repair—calcification and fibrosis. Mode of spread of the disease—contiguity, lymphogenic, bronchogenic and haematogenic.

Doctrine of stages of the disease—Ranke's classification.

Special characters of bronchogenic and haematogenic disease.

General types of lesion—exudative, productive and intermediate.

Formation and evolution of cavity in the lung. Pathology of pleura.

*Epidemiology of Tuberculosis with special reference to India (2 lectures)—*

Spread of tuberculosis in a race or community.

Factors causing the spread or retardation of tuberculosis.

*Anatomy of the Chest (2 lectures)—*

The thoracic cage—the skeleton, muscles, vessels and nerves. The diaphragm.

The mediastinum, the heart.

The bronchial tree, the blood vessels, lungs and pleural membranes, including their histology.

The lymphatic and nervous systems.

*Physiology of Respiration (2 lectures)—*

Mechanism of respiration.

Pulmonary circulation and oxygenation of the blood.

Intra-pleural pressure and gaseous exchange when pleural space contains gas or fluid.

*Diagnosis (8 lectures)—*

Childhood type.

Adult type.

History-taking.

Symptoms and signs.

Physical examination and charting of findings.

Laboratory investigations in diagnosis:

1. Examination of sputum—smear, concentration, culture and animal inoculation tests.



2. Stomach wash—smear, concentration, culture and animal inoculation tests.
  3. Faeces and urine—smear, concentration, culture and animal inoculation tests.
  4. Pleural and other fluids—smear, concentration, culture and animal inoculation tests.
  5. Blood tests : Sedimentation rate of R. B. C. Lymphocyte to Monocyte ratio, Von Bonsdorff's count ; Schilling's count, Blood indices : Houghton, Frimodt-Moller-Barton ; value of blood counts and their interpretation.
- Tuberculin tests and their interpretation : Von Pirquet, Mantoux and Patch tests, Subcutaneous test.
- Radiological examination : Physics of X-rays ; technique of examination, Fluoroscopy, skiagraphy (including stereoscopy and tomography) and bronchography ; Interpretation of X-ray appearances.
- Bronchoscopy, diagnosis pneumothorax, etc.
- Differential diagnosis of lung tuberculosis and non-tuberculous pulmonary conditions stimulating tuberculosis—in children and adults.

*Treatment (15 lectures)—*

General principles of treatment.  
 Sanatorium regimen—rest and graduated exercise.  
 Collapse therapy.  
 Chemotherapy, its principles and applications.  
 Specific therapy, *e.g.*, with tuberculin.  
 Diet.  
 Hygienic regime.  
 Fresh air and climatic considerations.  
 Physical therapy : heliotherapy.  
 Treatment of symptoms.  
 Collapse therapy considered in detail :  
 Historical review.  
 Rationale of collapse therapy.  
 General indications and contra-indications.  
 Artificial pneumothorax therapy—unilateral, bilateral.  
 Phrenic operations.  
 Scalenectomy and scaleniotomy.  
 Intrapleural pneumolysis—open and closed.  
 Extrapleural pneumolysis.  
 Supraperiosteal and Subcostal pneumolysis.  
 Multiple intercostal nerve paralysis.  
 Oleothorax.  
 Extrapleural pneumothorax.  
 Thoracoplasty—Partial thoracoplasty, thoracoplasty with  
 extrafascial apicolysis, anterolateral thoracoplasty,

paravertebral thoracoplasty, combined with phrenicectomy, secondary thoracoplasty, axillary thoracoplasty. General principles in the choice of the method and combinations of the operations; choice of an anaesthetic.

Results of collapse therapy.

Some pathological considerations in collapse therapy.

Other operations:

Open drainage of cavities.

Aspiration closure of cavities (Monaldi).

Gelatin—Acrifiavin method.

Lobectomy; pneumonectomy.

Pneumoperitoneum.

*Diagnosis and Treatment of Complications (6 lectures)—*

Haemoptysis.

Spontaneous pneumothorax.

Miliary Tuberculosis.

Tuberculous meningitis.

Pleural Tuberculosis; pleural effusion; pleuro-pulmonary fistula.

Secondary involvement of the intestine.

Secondary involvement of the larynx.

Non-pulmonary Tuberculous lesions associated with pulmonary Tuberculosis.

Pregnancy and Tuberculosis.

Pulmonary Tuberculosis in association with—

Malaria

Kala-azar

Diabetes

Syphilis

Heart Disease

Bronchial Asthma

Silicosis

Leprosy

Cardiovascular diseases

*Prognosis (2 lectures)—*

After-care—Relapses.

How to assess prognosis

Immediate Prognosis.

Relapses.

Prognosis at the end of active treatment. Prognosis regarding restoration of working capacity.

Follow-up of cases.

Ultimate prognosis.

Review of results obtained by the different methods of treatment.

*General and social aspects of Tuberculosis (6 lectures)—*

After-care and rehabilitation.

Classification of Pulmonary Tuberculosis: at time of diagnosis; at time of discharge from an institution; at termination of treatment.

Psychology of Tuberculous patients.

The State and Tuberculosis.

Industry and Tuberculosis.

Importance of early diagnosis.

The private practitioner and Tuberculosis.

Pneumoconiosis and Tuberculosis.

Anaesthesia in cases of Pulmonary Tuberculosis.

Tuberculosis and Insanity.

The place of statistical studies in Tuberculosis.

*Prevention and Control of Tuberculosis (9 lectures)—*

Problems of prevention of Tuberculosis in India.

A complete anti-tuberculosis scheme; a comparative study of schemes in different countries.

Prophylaxis of tuberculosis; immunisation with B.C.G. and other vaccines.

The evolution of an anti-tuberculosis scheme for India (including organised home-treatment).

Functions, organisation and working of a Tuberculosis Clinic:

Management of a tuberculosis Clinic.

Dispensary Registers and Records.

The role of the Health Visitor and Public Health Nurse.

The selection of site, organisation and working of a Tuberculosis Sanatorium.

The place of maternity clinics, school health, preventoria, etc., in an anti-Tuberculosis campaign.

Legislation and Tuberculosis—Notification, health insurances, etc.

Bovine tuberculosis in man; cattle tuberculosis.

The training of Tuberculosis Doctors, Tuberculosis Health Visitors and Nurses.

*Tuberculosis Surveys (4 lectures)—*

Purpose, principles, types, organisation and method of conducting; statistical evaluation of data.

Tuberculosis surveys and their value in the control of Tuberculosis; I.R.F.A. Committee types, contact survey; mass-radiography.

*Investigation and Research (1 lecture)—*

Their importance; scope and possible lines.

*Non-Pulmonary Tuberculosis (10 lectures)—*

General consideration and mode of infection in non-pulmonary tuberculosis.

Osteo-Articular Tuberculosis.

General pathological considerations.

Diagnosis.

General principles of treatment.

(a) Spinal tuberculosis: Pathology, signs and symptoms of different localisations, complications and treatment, (b) Hip-joint tuberculosis: Pathology, signs and symptoms, complications and treatment. (c) Knee-joint Tuberculosis: Pathology, signs and symptoms, complications and treatment. (d) Tuberculosis of other bones and joints.

Glandular tuberculosis: Neck glands, *Tabes mesenterica*, etc. Differential diagnosis, signs and symptoms, complications and treatment.

Genito-urinary tuberculosis: Kidney, Epididymis, tests, ovary, Fallopian tubes, etc.

Primary intestinal tuberculosis: incidence, pathology, differential diagnosis, treatment and prevention. Tuberculosis of the Peritoneum.

*Fistula in ano.*

Skin tuberculosis.

Ocular and aural tuberculosis.

Laryngeal tuberculosis.

Tuberculosis of the nervous system.

## PRACTICAL (INCLUDING DEMONSTRATION)

### *Bacteriology*

	Hrs.
1. Smear Examination of sputum—Ziehl-Neelsen and Picric acid .. .. .	2
2. Preparation of different culture media for tubercle bacilli .. .. .	2
3. Culture of the bacilli from sputum .. .. .	2
4. Culture of the bacilli from pleural fluid .. .. .	2
5. Culture of the bacilli from other tuberculous fluids .. .. .	4
6. Demonstration of the cultural characters of different types of the bacilli and demonstration of other differentiating points between human and bovine bacilli .. .. .	2
7. Examination of faeces for tubercle bacilli .. .. .	2

### *Pathology*

1. Total and differential counts of blood .. .. .	2
2. Von Bondorff's count of blood .. .. .	2
3. Schilling's count of blood .. .. .	2
4. Sedimentation rate of erythrocytes .. .. .	4
5. Lymphocyte : Monocyte ratio of blood .. .. .	2
6. Opsonic index of blood .. .. .	2

7.	Method of animal inoculation with bacilli ..	2
8.	Post-mortem examination of an animal, and how to make sections of organs for histological examination .. .. .	2
9.	Post-mortem examination of a human body and how to make sections for histological examination	4
10.	Normal lung and different types of tuberculous disease of the lungs—demonstrations ..	2
11.	Histology of normal lungs and pleura (demonstration)	2
12.	Histology of tuberculous lungs and pleura (demonstration) .. .. .	6
13.	Staining methods for tissues—Preparation of the tissue—Section cutting—Staining and diagnosis	6
14.	How to preserve and bottle a specimen ..	2
15.	Tuberculin tests and readings .. ..	4
16.	Macroscopic and Microscopic appearances of tuberculous lesions of other organs (demonstration)	6
17.	Demonstration of Para-tuberculous lesions ..	2

### *Radiology*

1.	Demonstration of an X-Ray plant .. ..	1
2.	Demonstration of screen examination .. ..	1
3.	Demonstration of taking a skiagram and developing the film .. .. .	4
4.	Demonstration of stereoscopic pictures and tomography .. .. .	2
5.	Demonstration of lipiodol Bronchography ..	1
6.	Demonstration of mass radiography technique ..	1

### *Clinical*

1.	Demonstration of Bronchoscopy .. ..	2
2.	Demonstration of examination of the larynx ..	2
3.	Demonstration of cystoscopy .. ..	2
4.	Radiographic demonstration of kidney and intestinal lesions .. .. .	2
5.	Demonstration of the method of estimating vital capacity .. .. .	1
6.	Demonstration of the method of estimating Basal Metabolism .. .. .	4
7.	Demonstration of the method of determining the size and concentration of dust in the atmosphere	1
8.	Demonstration of the method of ophthalmoscopy ..	1
9.	Demonstration of lumbag puncture .. ..	1
10.	Demonstration of all methods of collapse therapy and participation in some of them .. ..	5

11. Demonstration of fixation of joints and spine	..	2
12. Demonstration of selected cases	..	12

*Public Health Aspects*

Methods of health visiting	..	8
Demonstration of field studies, if available	..	2
Visits to clinics, tuberculosis hospitals and administrative offices of the Government and the Bengal Tuberculosis Association	..	5
Total	..	125

## CHAPTER XLIX—E

### DIPLOMA IN DIETETICS (DIP. DIET.)

1. An examination for the Diploma in Dietetics shall be held twice in each year in Calcutta and such other places as shall from time to time be appointed by the Syndicate and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any candidate may be admitted to the examination, provided he has fulfilled the following conditions :—

That he is either—

- (i) Bachelor of Medicine and Surgery or
- (ii) Holder of University Degrees with Physiology or Chemistry as one of the subjects.
- (iii) Holder of a Diploma or Degree in Domestic Science or Nursing from a recognised Institute.
- (iv) A fully qualified Nurse, provided she passed the Intermediate Examination in Arts or Science with Chemistry or Physiology as one of the subjects.
- (v) That he has since obtaining the qualifications mentioned above completed a regular course of study both theoretical and practical in the subjects for the examination for one academical year in any institution recognised by the University for this purpose.

3. Every candidate for the Diploma Examination in Dietetics shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate at least six weeks before the date fixed for the commencement of the examination.

4. A fee of Rs. 100 shall be forwarded by each candidate with his application.

A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee but such a candidate may be admitted to one or more subsequent examinations on payment of a like fee of Rs. 100 without being required to attend a fresh course of lectures.

5. The limits of the subject shall be as follows :—

- (1) Elements of Anatomy and Physiology including Biology of cells.
- (2) Physiology of digestion, assimilation and metabolism of food.
- (3) Biochemistry of food and nutritional requirements in terms of various nutrients.
- (4) Hygiene of food, including microbiology, quality of raw foods, storage, handling, cooking and distribution of meals.

- (5) Nutritional state and Physical fitness including deviations from normal health.
- (6) Calculation of the nutritional value of foods from the table of food values and planning of menus.
- (7) Infant feeding and dietetic management of expectant and nursing mothers.
- (8) Dietotherapy—General principles and management of patient's diets.
- (9) Dietotherapy—Specific diets in the various diseases and infirmities.
- (10) Management of the sick ; dietetic approach to patients ; individual likes and dislikes for various foods. Preparation of sick diets.
- (11) Economics—Elementary Principles : influence of income on structure of diets ; making best use of the money spent on food in lower income groups.
- (12) Business management ; keeping of accounts, making of purchase. Handling subordinate Staff.
- (13) Principles of cooking, cooking attractive meals, large scale catering, communal feeding.

Detailed syllabuses shall be passed by the Syndicate from time to time on the recommendation of the Board of Studies in Medicine.

6. The subjects for the examination, full marks for each subject and the minimum marks required for passing shall be as follows :—

<i>Written Papers</i>		Maximum Marks	Pass Marks
Paper I—Science of Nutrition	..	50	25
Paper II—Applied Nutrition	..	50	25
Paper III—General Dietetics	..	50	25
Paper IV—Applied Dietetics	..	50	25
<i>Practicals</i>			
Practical examination in Nutrition	..	100	50
Practical examination in Dietetics	..	100	50
(Candidates will be required to prepare diets on the advice of a physician for a particular disease)			
<i>Viva voce</i>	..	100	50
Total	..	500	250

7. In order to pass a candidate must obtain 50 per cent. in each of the theoretical and practical subjects.

8. As soon as possible after the examination the Syndicate shall publish a list of successful candidates in order of merit.



## CHAPTER XLIX-F

### DIPLOMA IN CHILD HEALTH

1. An examination for a ' Diploma in Child Health ' shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 100 at least one month before the date fixed for the examination.

3. If a candidate, after completion of a regular course of study for the examination, does not present himself for the examination or fails to pass the examination, immediately succeeding such completion, he may appear at any of the four following examinations on payment of the prescribed fee without special permission of the Syndicate.

4. Any Bachelor of Medicine and Bachelor of Surgery of this University or of any University recognised by this University or any licentiate in Medicine and Surgery of this University, who has taken the Degree not less than two years previously, may be admitted to this examination on production of certificates of having, subsequent to his admission to the M.B.B.S. Degree or passing the L.M.S. Examination,

(i) (a) spent at least one year for not less than six hours a week in Post-Graduate study in Pediatrics at a Hospital or Institution recognised for the purpose and spent three months in study of General Medicine at a Hospital or Institution recognised for the purpose ;

or

(b) held for, at least, six months a House Physician's appointment at a General Hospital and spent at least six months for not less than six hours a week in Post-Graduate study in Pediatrics at a Hospital or Institution recognised for the purpose ;

(c) held for, at least six months a House Physician's appointment in a Children's Hospital or in the Pediatrics Department of a General Hospital recognised for the purpose and spent, at least, six months for not less than six hours a week in Post-Graduate study of Pediatrics at such a recognised Hospital or Institution and spent three months in the study of General Medicine at a recognised Hospital or Institution.

(ii) Put in 20 attendances of not less than one hour each in the study of Infectious Diseases at a Hospital or Institution recognised for the purpose.

(iii) Spent six weeks in study at an approved Child Welfare Centre and at a Creche and at a Child Guidance Clinic or carried out at least one Infant Welfare Survey.

(iv) Satisfactorily completed the courses of special instruction, of not less than 40 hours, in the syllabus as prescribed for this Diploma.

(v) Attended for a period of not less than 20 hours a practical course of Pathology and Bacteriology with special reference to Pediatrics.

5. The above conditions of study may be relaxed, at the discretion of the Syndicate on the recommendation of the Board of Higher Studies in Pediatrics or, until it is constituted, by the Faculty of Medicine, in the case of candidates who have carried out original investigation in any branch of the subject or obtained the Degree of M.B. of this University or of any other University recognised by it.

6. The examination shall be Written, Oral and Practical. There shall be four papers in the written examination as under—

Paper I—Diseases of Children.

„ II—Diseases of Children.

„ III—Development of Children, Child Health and Preventive Pediatrics, Dietetics.

„ IV—Child Psychology and Management and Public Administration relating to children.

Each paper shall be of 3 hours' duration and shall carry 100 marks.

7. The Practical examination shall consist of oral and practical Tests and shall carry marks as under—

Oral	..	..	100 marks
Practical	..	..	200 marks

8. In order to pass the examination, a candidate must obtain 50 per cent. of the total marks in written and Oral and 50 per cent. of the total marks in the practical.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in order of merit. Each successful candidate shall be given a diploma in the form prescribed in the Appendix.

10. The limits of subjects shall be as follows:—

(a) Applied Anatomy, including Embryology and Developmental Anomalies; Applied Physiology and Psychology of Childhood.

(b) The growth and development from Birth to Adolescence.

(c) The care of the well and the ill child, including Prophylaxis, Hygiene and Mental supervision, specially, preventive Pediatrics.

(d) Dietetics of normal and abnormal children.

(e) Diseases of Children, including their Pathology, Prevention and Treatment.

(f) Legislation and Public Administration in regard to the care of children, including the methods of an Infant Welfare Centre.

The detailed syllabus within the limits of the subject shall be laid down by the Board of Studies in Medicine or by the Board of Higher Studies in Pediatrics when appointed subject to the sanction by the Syndicate.

*Note.*—(1) An institution recognised for the purpose of this diploma must be either a Children's Hospital having not less than 50 medical beds or Children's Department of a General Hospital containing not less than 50 children's beds.

(2) Attendances must be so arranged as to allow students to study a variety of infectious diseases according to their prevalence.

(3) The term childhood includes the age period from birth to adolescence.

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## CHAPTER L

### DIPLOMA IN PUBLIC HEALTH

1. An examination for a Diploma in Public Health shall be held twice every year in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

The examination shall be divided into two parts, Part I and Part II, as defined below in Section 5.

2. Any Bachelor of Medicine and Surgery or Licentiate in Medicine and Surgery may be admitted to this examination on production of certificates of having, subsequent to passing the M.B.B.S. or L.M.S. Examination,—

(i) attended during a period of not less than three and a half months approved courses of instruction in (a) Bacteriology including Immunology and Serology, Filterable Viruses and the Rickettsias, Medical Entomology, Protozoology and Helminthology especially in their relation to diseases of man and to those diseases of the lower animals transmissible to man—this course to last at least 200 hours; (b) Public Health Chemistry and Physiology (Biochemistry and Biophysics) applied to public Health—this course to last at least 160 hours;

(ii) been diligently engaged for at least six months in acquiring a practical knowledge of the duties, routine and special, of public health administration under the supervision of a recognised medical officer of health of a town or sanitary area of not less than fifty thousand inhabitants, who shall certify that the candidate has received from this officer or from other competent Medical officer, during not less than three hours on each of 60 working days, instruction in these duties [a candidate who produces evidence that he has been in independent sanitary charge of a town or district (or, in the case of Calcutta, a part of a district) for a period of at least six months may under very special circumstances be exempted from this rule];

(iii) attended for three months in the clinical practice of a recognised hospital for infectious diseases and received therein instruction in the methods of administration (at least 30 attendances of not less than two hours each shall be required);

(iv) received, during not less than 80 hours at an institution or from teachers approved by the University, instructions in the following subjects :—

The principles of Public Health and Sanitation ..	30 hours
Epidemiology and Vital Statistics .. ..	20 ..

Sanitary Law and Administration ..	20 hours
Sanitary Construction and Planning ..	10 „/

(the numbers indicate the approximate proportion of hours to be devoted to each subject);

(v) practised the medical profession for a continuous period of one year and a half which may include the period of training specified above.

Provided that a candidate may appear in Part I (but not Part II) of the examination on the completion of a year of practice. Provided also that a candidate may not appear in Part II until he has passed in Part I of the examination.

3. Every candidate for admission to each part of the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 100 at least one month before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a fee of Rs. 50 on each occasion.

5. Every candidate shall be examined in the following subjects :—

#### PART I

- (a) Microbiology including Bacteriology, Immunology and Serology, Filterable Viruses and the Rickettsias, Medical Entomology, Protozoology and Helminthology—(One Paper).
- (b) Public Health Chemistry and Physiology (Biochemistry and Biophysics) applied to Public Health—(One Paper).

#### PART II

- (c) Hygiene and Sanitation including Sanitary Engineering—(One Paper).
- (d) Epidemiology and Infectious Diseases—(One Paper).
- (e) Sanitary Law, Vital Statistics and Public Health Administration—(One Paper).

The examination shall be Written, Oral and Practical and shall include Food Inspection and Sanitary Inspection of factories, schools, premises or areas.

6. The limits of subjects referred to in paragraphs 5 shall be as follows :—

#### (a) MICROBIOLOGY

##### (i) *Bacteriology* :

The classification of bacteria, their morphology and physiology including their cultivation, fermentation, reaction and pathogenicity.

The Pathogenic Cocci and Bacteria—Streptococcus, Meningococcus, Gonococcus, Typhoid, Salmonella, Dysentery, Diphtheria, Mallei, Tubercle, Leprosy, Plague, Melitensis, Abortus, Anthrax, Tetanus, Botulinus and the Cholera vibrio, including the mode of transmission and method of isolation.

The preparation, standardisation, storage and uses of prophylactic vaccines.

The destruction of bacteria and disinfection.

The bacteriology of water, milk and milk products and other foodstuffs including the methods of collection and examination of samples and interpretation of the results obtained.

The bacteriology of air, dust, soil and sewage.

(ii) *Immunology and Serology :*

Different forms of immunity in the individual. Mechanism of immunity in different infections. Immunity in the herd.

The serological tests in common use in diagnosis. Agglutination, Precipitation, Flocculation, Jellification, Complement fixation and Allergic Tests.

Immunisation, including the preparation, standardisation, storage and use of anti-sera used in prophylaxis and treatment.

(iii) *Filterable Viruses and the Rickettsias :*

The general characteristics of viruses and the methods of studying them—filtration, tissue culture, cell inclusions.

The pathogenic viruses—variola, vaccinia, measles, chicken-pox, poliomyelitis, influenza, encephalitis, lethargica, yellow fever, dengue, papataci fever, rabies, trachoma, including the mode of transmission of diseases caused by them.

Methods of preparation, storage and uses of prophylactic vaccines against smallpox, rabies, yellow fever.

The bacteriophage and its uses in public health.

The Rickettsias and their mode of transmission.

(iv) *Medical Entomology :*

The classification of the Animal Kingdom and the general characters of insects, including their collection, identification and preservation.

Insects concerned in the transmission of disease—mosquito, sandfly, housefly, flea, louse, tick, mite. Their life-cycle and habits, the way in which they act as carriers and the methods of control.

(v) *Protozoology :*

The classification of protozoa, their morphology and methods used in studying them.

The pathogenic protozoa—*E. histolytica*, *G. lamblia*, *B. coli*, *L. donovani*, *L. tropica*, *P. vivax*, *P. malariae*, *P. falciparum*, Trypanosomes, Coccidia and Sarcosporidiae, including the mode of transmission and methods for collecting and examining infective material.

The pathogenic spirochaetes—*T. pallidum*, *T. pertenue*, *Sp. recurrentis*, *Lept. icterohaemorrhagiae*, and the spirochaetes of Vincent's angina and Naga sore. Their mode of transmission and methods for collecting and examining infective material.

(vi) *Helminthology* :

The classification of the helminth parasites, their morphology and methods used in studying them.

Helminths of public health importance.—Nematodes—Hookworms, *Wuchereria bancrofti*, *Filaria malayi* and *Dracunculus medinensis*. Cestodes—*Tenia solium* and *saginata*, *Echinococcus*; and Trematodes. Their morphology, biology, recognition and life-history. Mode of transmission and methods of destruction of helminths in various materials.

(b) PUBLIC HEALTH CHEMISTRY AND PHYSIOLOGY (BIO-CHEMISTRY AND BIO-PHYSICS) APPLIED TO PUBLIC HEALTH

(i) *Public Health Chemistry* :

General principles and methods of quantitative analysis, volumetric, gravimetric and gasometric. The theory and determination of Hydrogen-ion concentration. Methods of collection of water, sewage, sewage effluents and other effluents, milk, common articles of foods and disinfectants, such as cyano gas, pyrethrum, retinone, paris green, mineral oils, etc., for chemical analysis. Principles of qualitative and quantitative analysis of the above substances. Interpretation of reports of analysis.

(ii) *Physiology (Bio-Chemistry and Bio Physics) applied to Public Health* :

General: Adjustment of individuals and communities to environment—internal and external—influencing the state of health. The span of life, its prolongation and rejuvenescence. Influence of geographical position and altitude on health including climatological considerations. Physiological effects of radiations, e.g., infra-red, ultra-violet, X-ray, etc. Illumination and hygiene of the eyes. Physiology of ventilation, air cooling and air conditioning. Clothing in the tropics. Urban and rural environments. Socio-economic factors. Occupational environment, agricultural, industry, smoke, dust and gas pollution of air. Effects of noise and vibration. Assessment of physical fitness.

**Practical work :** Methods of determining temperature, humidity and atmospheric pressure. Methods of measuring comfort conditions. Detection and estimation of atmospheric pollution due to smoke, dust and poisonous gases. Photometric measurement of natural and artificial light in schools and factories. Determining efficiency of clothing. Estimation of work and total metabolism : determination of onset of fatigue and inefficiency. Treatment of asphyxia, electric shock and gas poisoning.

(iii) *Nutrition :*

The place of nutrition in public health, its special significance under Indian conditions. Basal and total metabolism. Energy requirements and caloric values of foods. Carbohydrates and fats and their rôle in nutrition. Protein requirement of man and its determination. Inorganic elements, calcium, phosphorus, iodine, iron, copper and other trace elements and their importance in nutrition. Vitamins, their nature, function, optimum requirements, clinical and pathological results of vitamin deficiencies. Balanced diets in relation to age, sex, occupation and physiological states. Methods of cooking and their effect on the nutritive values of foods. Assessment of state of nutrition of individuals and of communities. Methods of conducting dietary surveys and making suggestions for improvement. Methods of conducting field experiments in nutrition. Socio-economic factors in nutrition. Relation of agriculture, animal husbandry and food industries to nutrition. Nutrition propaganda.

**Practical work :** The use of food analytical tables in planning of balanced diets for various groups. Detection of vitamin and other deficiencies by anthropometric, clinical and physiological methods. Nutrition and dietary surveys and constructive criticism of food habits and food production.

(c) **PRINCIPLES OF PUBLIC HEALTH AND SANITATION**

The principles and practice of personal, communal, international and occupational hygiene. The effect of climate environment and food on the human organism and communities, water and water-supplies ; water purification and disinfection, waterborne diseases. The study of the atmosphere in its relation to health and disease ; ventilation of towns, houses and buildings ; the causes and effects of vitiation of the atmosphere ; the planning of towns, villages, houses and huts, factories and barracks.

The effect of soils on health ; building sites. The collection and disposal of refuse and excretal matter. Foodstuffs, their composition, purity, examination, sophistication, etc.



The study of diets specially in regard to tropical countries with special reference to such diseases as beriberi, epidemic dropsy, rickets, scurvy, etc.

The effects of famine conditions and economic stress on the human organism. Clothing in relation especially to climate.

Epidemic, endemic and infectious diseases of both temperate and tropical climates. Their epidemiology, geographical and seasonable distribution, origin, causation, mode of spread, etc., and prevention, special attention being paid to the study of such diseases as occur in India.

The control and prevention of infectious diseases by isolation, disinfection, vaccination, etc., with special reference to small-pox, cholera, plague and other tropical diseases. The construction and administration of hospitals for infectious diseases. Industrial hygiene, the special diseases of occupations, causation, their detection and prevention. Maternity and child welfare work.

School hygiene and medical examination of school children. Anti-tuberculosis schemes and their applicability. Venereal diseases; their cause: their control and treatment by the State. The control of food-supplies, markets, dairies, milkshops, slaughter houses.

Meat inspection, food inspection, methods of examination of sound and unsound food.

Building construction; the making of plans, their interpretation and criticism.

#### (d) SANITARY LAW

The history of sanitary law and administration in England, India and other countries. The present system of sanitary administration in India. Forms of Local Government and their relation to public health and sanitation. The sanitary laws and enactments of Great Britain and India. The duties of health officers, sanitary inspectors, factory inspectors, certifying surgeons—Port-Health laws and duties of Port-Health officers.

#### (e) VITAL STATISTICS

The collection, modes of calculation and the interpretation of vital statistics. The census; calculation of population, birth rates, death rates, marriage rates, infantile mortality rates, etc. Elementary statistical methods and their application and interpretation. Life tables. The preparation of sanitary reports. The study of the Annual Reports of Public Health Commissioner and Directors of Public Health in India; methods of epidemiological investigation.

7. The full marks for each subject and the minimum marks required for passing shall be as follows :—

	Written		Oral and Practical		Total Passing marks
	Total marks	Passing marks	Total marks	Passing marks	
<i>Part I</i>					
Bacteriology and Parasitology.	50	25	50	25	50
Public Health Chemistry and Bio-Physics and Bio-Chemistry.	50	25	50	25	50
<i>Part II</i>					
Hygiene and Sanitation ..	50	25	50	25	50
Epidemiology and Infectious Diseases ..	50	25	50	25	50
Sanitary Law, Vital Statistics, etc. ..	50	25	50	25	50

8. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order. If, in the opinion of the Examiners, sufficient merit be evinced, a University gold medal will be awarded to the candidate who shall have passed with the greatest distinction.

## CHAPTER L-A

### DOCTOR OF SCIENCE (PUBLIC HEALTH)

1. An examination for the Degree of Doctor of Science (Public Health) shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine and Surgery or Licentiate in Medicine and Surgery may be admitted to this examination on the production of certificates of having—

(a) subsequently to passing the M.B.B.S or L.M.S. Examination, obtained a Diploma in Public Health or passed an examination equivalent thereto, and

(b) subsequently to obtaining the qualifications as mentioned in (a), undergone (i) at least two years' regular training in a recognised institution in some special subject on Public Health previously approved by the Faculty of Medicine, or (ii) at least three years' work in any other approved Laboratory in some special subject on Public Health previously approved by the same Faculty.

3. Every candidate shall state in his application the special branch or subject in Public Health, upon a knowledge of which he rests his qualification for the Doctorate.

4. Every candidate for admission to the examination shall send his application to the Registrar with the necessary certificates and a fee of Rs. 300 at least one month before the date fixed for the commencement of the examination.

No application shall, however, be entertained unless the Head of the Institution in which the applicant has worked as required under clause (b) of Section 2, or a Doctor in any Faculty of this University or of a University approved by the Syndicate from time to time shall have testified, to the satisfaction of the Syndicate, that in habits and character the candidate is a fit and proper person for the Degree.

5. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of three hundred rupees on each occasion.

6. A candidate for the Degree of Doctor of Science (Public Health) shall transmit to the Registrar, along with his application, a thesis or published work embodying the result of research carried out independently or under approved direction

and having definite relation to Public Health. The candidate must indicate in what respects his thesis or published work appears to him to advance the knowledge in the science of Public Health.

7. The thesis shall be referred by the Syndicate to a Board of not less than two Examiners.

If the thesis or published work is approved by the Board of Examiners, they will report on the same as "commended" or "highly commended." Unless the thesis is commended, the candidate shall not be admitted to the examination.

8. Every candidate shall be examined in the following subjects :—

General Public Health Subject—(*One Paper*).

Special Public Health Subject offered by the candidate under para. 3—(*One paper*).

Thesis.

In addition to the written examination, the candidate may be required to undergo an Oral and Practical examination at the discretion of the examiners.

The examination shall be conducted by the same Board of Examiners appointed to examine the thesis, unless the Syndicate otherwise directs.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order with the titles of their theses placed against the name of each candidate. If, in the opinion of the examiners, sufficient merit be evinced, a University Gold Medal shall be awarded to the candidate passing with the greatest distinction.

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## CHAPTER L-B

### INTERMEDIATE EXAMINATION IN NURSING

1. The Intermediate Examination in Nursing shall be held annually in Calcutta and such other places as shall from time to time, be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Any undergraduate of the University may be admitted to this Examination, provided he has prosecuted a regular course of study in an institution or institutions affiliated to or recognised by the University for this purpose for not less than two academical years after passing the Matriculation Examination.

Any student who has passed the Junior or the Senior Certificate Examination in Nursing or the examination for Health-Visitors may take up the course of the Intermediate Examination in Nursing at the 2nd-year's stage and after one year's regular course of study appear at the examination.

3. Every candidate sent up for the Intermediate Examination in Nursing shall produce a certificate, (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the Test examination of the institutions and (d) of probability of passing the examination. Every candidate for admission to the examination shall send in his application with a certificate in the form prescribed by the Syndicate to the Controller of Examinations at least six weeks before the date fixed for the examination with an Examination fee of Rs. 30. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee.

A candidate who fails to pass may be admitted to one or more subsequent Intermediate Examination in Nursing on payment of the prescribed fee on each occasion.

4. The Intermediate Examination in Nursing shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

5. As soon as possible after the examination, the Syndicate shall publish a list of candidates who have passed the examination arranged in two divisions in order of merit. Every candidate shall on passing, receive a certificate in the form entered in Appendix A.

6. The subjects for the Intermediate Examination in Nursing shall be as follows :—

1st-year—Literature, Social Welfare, Psychology, Anatomy and Physiology, Preventive and Social Medicine, Physics and Chemistry, Medicine.

Nursing—Principles of Nursing (History of Nursing, Massage, Medical Nursing).

Practice in Nursing (Medical).

2nd-year—Literature, Sociology, Food Chemistry, Medicine and Surgery, Dietetics and Nutrition, Physiology, Psychiatry.

Nursing—History of Nursing Practice, Practice in Nursing (Medical including Leprosy).

The Syndicate shall have power to add to or modify the list, and to frame detailed syllabuses in different subjects from time to time.

### *General*

1. In order to pass the Intermediate Examination in Nursing, a candidate must obtain—

- (a) In each subject : Written—50% ;  
Oral and Practical—40% ;  
Total 50%.
- (b) In aggregate : Written —50% ;  
Oral and Practical—40% ;  
Total 50%.

2. In order to be placed in the First Division, a candidate must obtain at least 60% of the marks in each subject.

3. Any candidate who has failed in one subject only and by not more than 5% of the full marks in that subject and has shown merit by gaining 50% or more in the aggregate of the marks of the examination, shall be allowed to pass.

4. If the Examination Board is of opinion that in the case of any candidate not covered by the preceding Regulations consideration ought to be allowed by reason of his high proficiency in a particular subject or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reason for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

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## CHAPTER L-C

### BACHELOR OF NURSING

1. An examination for the Degree of Bachelor of Nursing will be held annually in Calcutta and such other places as shall from time to time be appointed by the Syndicate and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any under-graduate of this University may be admitted to the examination, provided he has prosecuted a regular course of study for not less than two academical years after passing the Intermediate Examination in Nursing in an institution or institutions affiliated to or recognised by the University in the subjects which the candidate takes up:

Provided that holders of Junior or Senior Nursing Certificates who have been trained in recognised hospitals may take up the course for the Degree of Bachelor of Nursing after they have successfully worked in their professional capacity for three and two years respectively and that health-visitors may also take up the course after two years' work.

3. Every candidate sent up for the examination for the Degree of Bachelor of Nursing by an affiliated or recognised institution shall produce a certificate, (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the college periodical examinations and other tests and (d) of probability of passing the examination. Every candidate shall send in his application with a certificate in the form prescribed by the Syndicate to the Registrar at least six weeks before the date fixed for the commencement of the examination.

4. A fee of Rs. 45 shall be forwarded by each candidate with his application. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee but he may be admitted to one or more subsequent examinations for the Degree of Bachelor of Nursing on payment of the prescribed fee.

5. The examination for the Degree of Bachelor of Nursing shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

Every candidate shall be examined in the following subjects :

*3rd-year* :—History, Economics, Child Psychology and Paediatrics, Principles of Public Health Nursing, Bacteriology, Pharmacology.

*4th-year* :—History, Sociology, Educational Psychology and Principles of Teaching.

*Nursing*—Principles of Public Health Nursing, Teaching Practice, Midwifery, Obstetrical Nursing, Obstetrical Nursing Practice and Public Health Nursing Practice, Mental Nursing Practice.

The Syndicate shall have power to add to or modify the list and to frame detailed syllabuses in different subjects from time to time.

6. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed, arranged in two divisions in order of merit.

### *General*

1. A candidate must obtain, in order to pass the examination—

In each subject :—

Written ..	..	..	50%
Oral and Practical ..	..	..	40%
Total ..	..	..	50%

2. Candidates obtaining 66% marks shall be declared to have obtained a First Class and those obtaining 50% marks shall be declared to have obtained a Second Class.

3. Any candidate who has failed in one subject only by not more than 5 per cent. of the full marks in that subject and has shown merit by gaining 50 per cent. or more in the aggregate of the marks of the examination shall be allowed to pass.

4. If the Examination Board is of opinion that, in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reasons for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

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## CHAPTER L-D

### DIPLOMA IN INDUSTRIAL HEALTH (D.I.H.)

1. An examination for the Diploma in Industrial Health shall be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

The examination shall be divided into two parts—Part I and Part II, as defined below in Section 6.

2. Any graduate in Medicine of a recognised Indian or foreign University or any physician who has passed an equivalent examination recognised by the Syndicate may be admitted to this examination on production of certificate of having, subsequent to passing the M.B. (M.B.B.S.) Examination :—

(i) undergone clinical training in any recognised hospital as a House Physician or a House Surgeon or any other equivalent capacity for a period of one year ;

(ii) attended during a period of not less than four months approved courses of instruction in (a) Communicable diseases, (b) Environmental Sanitation and (c) Public Health Administration ;

(iii) or as an alternative to (ii) obtain the Diploma in Public Health or a qualification recognised as equivalent by the Syndicate ;

(iv) attended for five months prescribed courses of instruction in (a) Industrial Law, Labour Relations, Industrial Health in India and Organisation of Industrial Health Services, (b) Industrial Hazards, (c) Applied Physiology including Industrial Psychology, (d) Occupational diseases and Industrial Medicine ;

(Instructions in the subjects specified above should include visits to hospitals, health offices, sanitary installation, etc.).

Provided that a candidate may not appear in Part II until he has passed in Part I of the examination.

3. A candidate with a D.P.H. or an equivalent qualification shall be deemed to have passed Part I of the examination.

4. Every candidate for admission to each part of the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 100 at least one month before the date fixed for the commencement of the examination.

5. A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a further fee of Rs. 100 on each occasion.

6. The examination shall consist of the following :—



Principles of Public Health Practice.

The background and application of vital statistics in Public Health Practice.

Specialised services in Public Health. Maternity and Child Health Service.

## 2. COMMUNICABLE DISEASES

Principles of Bacteriology, Protozoology, Helminthology, Entomology, Serology and Immunology.

Origin and spread of the common Communicable diseases, such as Malaria, Small Pox, Cholera, Plague, Typhoid, Typhus, Influenza, Tuberculosis, etc. Principles of Epidemiology and control of diseases in large communities.

## 3. ENVIRONMENTAL SANITATION

Housing, refuse collection and disposal, water supply, drainage, sewage disposal, Industrial Wastes and Stream Sanitation, Principles of town planning with respect to Industrial towns.

Hygienic provisions, baths, washing and sanitary accommodation, Atmospheric pollution, ventilation and lighting.

Elements of modern engineering practices, engineering practices, engineering control of Industrial hazards, design and working of exhaust hoods and plant sanitation.

Construction of hospitals, schools, factories and various other establishments. Rat-proof, fly-proof and mosquito-proof constructions.

## Part II

## 4. INDUSTRIAL HYGIENE—I

*Industrial Law and Labour Relations, Industrial Health in India and Organisation of Industrial Health Services*

Industrial Laws and Labour Relations, Industrial Health in India and Organisation of Industrial Health Services.

Industrial revolution—its cause and effect. Industrialisation of India. Forces that accelerate and retard industrialisation. The industrialist, the State and the worker. The labour Unions, the personnel officer and industrial relations, labour welfare and industrial health.

History of labour legislation in India and abroad. Structure of the Government and administration of Industrial Law in India. Labour legislation before and after Indian independence. Factory and mine inspection systems in India and abroad. Social security, State Insurance and future trends. Private enterprise vs nationalisation.

Industries and industrial centres in India—the common industrial processes used and the health hazards. The industrial worker in India—his income and expenditure.

Organisation, functions and its relation to the management, the workers and the State.

The past and the future in India of an integrated industrial Health Service. The personnel officer, the industrial physician, the industrial nurse, the industrial psychologist, the safety, ventilation and illumination engineer and the industrial hygienist. Industrial surveys and statistical sampling. Industrial labour organisation and international conventions.

## 5. INDUSTRIAL HYGIENE—II

### *Industrial Hazards*

Toxic agents in industry and modes of entry. Physiological and pathological effects.

Industrial toxicology, industrial air analysis and safe working limits.

Industrial dusts. Methods of examination of dusts, dust counting, varieties of dust in industry and their effects. Dust control methods. Design, care and use of respiratory protective appliances.

Industrial accidents and accident statistics, personal causes and prevention. Rehabilitation.

## 6. INDUSTRIAL HYGIENE—III

### *Applied Physiology including Industrial Psychology*

Physical environment and its relation to health or disease, temperature, humidity, air velocity and other climatic factors. Lighting and illumination, noise and vibrations, high and low pressures, physiological principles of air conditioning, humidity control in textile mills and environmental standards. Thermal comfort standards; health and efficiency in tropical climate. Evaporative heat loss and its importance. Physiological Principles applicable to clothing in tropics.

Fundamental principles of nutrition and their application. Dietary deficiencies in Indian workers and planning the workers mid-day lunch. Organisation of canteens.

Muscular work, rest pauses and hours of work in relation to efficiency, fatigue, boredom and discontent. Intelligence and aptitude tests, job analysis and placement of workers. Time and motion study and labour wastes. Vocational guidance.

Fatigue and muscular work.

Postural strain and effects specially in women. Posture and machine design. Lifting and transport of loads.

## 7. INDUSTRIAL HYGIENE—IV

*Occupational Diseases, Industrial Medicine*

Common occupational diseases, Aetiology, Pathology, Diagnosis, prevention and treatment. Incidence in India and notification.

Planning a medical department in industry; the industrial physician, the industrial nurse and the ancillary health services. Health education. Creches. Industrial Medical Practice and medical ethics.

The industrial hospital—surgical and medical emergencies—casualty service. Specialised services—ophthalmic, dermatological, orthopaedic, X-ray, tuberculosis and venereal. Recent advances and their application to Indian conditions.

Pre-employment, pre-placement and periodic medical examinations. Maintenance of health and sickness records.

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## CHAPTER LI

### BACHELOR OF ENGINEERING EXAMINATION

#### PART I

#### (COMMON TO CIVIL, MECHANICAL, ELECTRICAL AND METALLURGICAL COURSES)

1. The Bachelor of Engineering Part I Examination will be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Under-graduate or Graduate of the University who has passed the Intermediate Examination with Mathematics, Chemistry and Physics may be admitted to the Examination, provided he has prosecuted a regular course of study in a College of Engineering affiliated to the University for two academic years after passing the Intermediate Examination.

3. Every candidate for the B.E. Part I Examination shall be examined in the subjects mentioned in Section 10 below.

A candidate may be permitted to appear in any or all of the subjects mentioned below at the end of the First year subject to his completing the course in those subjects and passing the Test examination held by the college immediately preceding the University Examination. Such a candidate may obtain credit for those subjects in which he passes when appearing at B.E. Part I Examination. (i) English, Current Orientation and Civics, (ii) Engineering Physics (Paper), (iii) Engineering Physics (Sessional and Practical), (iv) Engineering Chemistry (Paper), (v) Engineering Chemistry (Sessional and Practical), (vi) Mathematics (Paper I).

4. In order to pass the Bachelor of Engineering Part I Examination a candidate must obtain forty per cent. of the full marks of each subject and half of the aggregate.

5. A candidate must pass Part I of the B.E. Examination within four years of the date of his admission to the course, provided that in his Fourth year he appears as a non-collegiate candidate. A candidate may, however, be permitted to appear after four years as a non-collegiate candidate if he is specially recommended by the Principal of his college.

6. Every candidate for admission to this Examination in whole or in part shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate and a fee of Rs. 40 at least a month before the date fixed for the commencement of the Examination.

A candidate who fails to pass or to present himself for the Examination shall not be entitled to a refund of the fee.

7. A candidate who fails in one subject only and by not more than five per cent. of the full marks in that subject, but has shown merit by gaining sixty per cent. or more in the aggregate marks of the Examination shall be allowed to pass.

8. If the Board of Examiners are of opinion that in the case of any candidate not covered by the preceding regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject or in the aggregate, they shall report the case to the Syndicate, and the Syndicate may pass such a candidate.

9. As soon as possible after the B.E. Part I Examination the Syndicate shall publish a list in order of merit of those who have passed the B.E. Part I Examination. Every candidate on passing shall receive a certificate in the form prescribed in Appendix A.

10. The subjects prescribed for B.E. Part I Examination and distribution of marks are as follows :—

(i)	English, Current Orientation & Civics	..	100
(ii)	Engineering Physics (Paper)	..	100
(iii)	Do. (Sessional & Practical)	..	100
(iv)	Engineering Chemistry (Paper)	..	100
(v)	Do. (Sessional & Practical)	..	100
(vi)	Mathematics, Paper I	..	150
(vii)	Do. Paper II	..	100
(viii)	Surveying (Paper)	..	100
(ix)	Do. (Sessional & Practical)	..	100
(x)	Details of Construction & Estimating	..	100
(xi)	Drawing (Paper)	..	100
(xii)	Do. (Sessional)	..	100
(xiii)	Heat Engines, I (Paper)	..	100
(xiv)	Do. (Sessional)	..	50
(xv)	Applied Mechanics, I & Graphics (Paper)	..	100
(xvi)	Do. Do. (Sessional)	..	50
(xvii)	Electro-technology (Paper)	..	100
(xviii)	Do. (Sessional & Practical)	..	50
(xix)	Sociology & Industrial Relations	..	100
(xx)	Workshops (Sessional)	..	200
Total			2000

11. The limits of the subjects are as follows :—

(I) ENGLISH, CURRENT ORIENTATION AND CIVICS

(a) English :—

Principles of English Composition and the rules of good use as applied to the word, the sentence, the paragraph and the whole composition. Development of vocabulary.

Class discussion of analysis of various types of English expressions. Letters, précis and essay writing. Talks and debates.

(b) Current Orientation :—

Careers and their meaning, Engineering, Industry, Science, Government Work.

(c) Civics :—

Modern forms of Government. Merits and Defects of Democracy. Public opinion. Political parties. Organs of Government—Legislature, Executive, Judicial. Separation of Functions. Organisation of the Legislature—executive and judiciary. Electorate—its extent and nature. Local Government—its categories. Citizenship. Rights and duties. Civic ideas. Nationalisms. United Nations Organisation.

(II) ENGINEERING PHYSICS (Paper)

The subjects are to be treated with reference to their application to Engineering problems as far as possible.

General Properties of Matter.—Viscosity and Viscometers.

Heat.—Technical thermometers. Calorimetry—principles and applications. Thermal conductivity theory and applications. Adiabatic and isothermal expansion.

Optics.—Defects of images formed by mirrors and lenses. Different types of eye-pieces. Telescopes, microscopes, sextants and other optical instruments used by Engineers.

Sound.—Recording and production of sound. Elementary treatment of acoustics of buildings.

Electricity and Magnetism.—Primary and secondary cells. Phenomena of hysteresis and their applications and measurements. Electro-magnetic instruments. Measurement of resistance, current and e.m.f. Electrostatic condensers and measuring instruments.

Elementary treatment of X-rays and electronics.

(III) ENGINEERING PHYSICS (Sessional and Practical)

The syllabus is mainly based on the subjects mentioned in the theoretical course.



## (IV) ENGINEERING CHEMISTRY (Paper)

Brief study of the manufacture, properties and uses in Engineering of copper, zinc, lead, tin, nickel, aluminium, iron and steel. The Cupola. Methods of making grey, chilled and malleable castings. Methods of shaping metals by forging, rolling and extruding. Short account of the metallography of steel. Hardening, tempering, annealing, normalizing and case hardening of steel and microstructure consequent on these operations. Corrosion of iron and method of its prevention. Protective coating of one metal on another. Paints, pigments and enamels. Welding and soldering of metals—brasses, bronzes, bearing and type metals.

Chemistry of boiler and potable water. Hard and soft water. Boiler scale, its composition and effect. Softening of boiler water. Substances that cause corrosion and priming. Significance of the presence of suspended solids, dissolved salt, albuminoid and saline ammonia, nitrites and nitrates in water.

Manufacture, composition and properties of limes, cements, plasters, common and refractory bricks, porcelain and glass. Building stones and road materials. Timbers and fabrics. Asphalts and lubricating oils and greases.

Study of the principal solid, liquid and gaseous fuels and combustion. Coal-tar and its derivatives and their uses. Flue gases and their composition.

Occurrence, characteristics, and chief uses of Indian coals.

## (V) ENGINEERING CHEMISTRY (Sessional and Practical)

Systematic qualitative study of simple and mixed substances containing not more than 3 radicals.

Acidimetry and Alkalimetry, determination of hardness of water; Volumetric and Gravimetric estimation of iron and calcium.

## (VI) MATHEMATICS—Paper I

(a) Elements of Analytical Geometry—Rectangular cartesian co-ordinates and polar co-ordinates—Distance between two points—Areas of polygons—Geometry of straight lines—Standard equations of circle, parabola, ellipse and hyperbola—Equations of tangent and normal. Elementary co-ordinate geometry of three dimensions—Distance between two points. Equation of the straight line and the plane—Standard equations of the conicoids.

(b) Introduction to Calculus.—Function, limits, continuity. Rules of differentiation and methods of differentiation. Differentiation of different functions. Tangent and normal.

Second derivative. Maxima and minima. Curvature (Cartesian form). Integration treated as inverse process of differentiation. Simple indefinite integrals. Integration by parts. Differential equations—equations with variables separable; Homogeneous equations.

(c) Mechanics.—General conditions of equilibrium. Friction. Machines. Elements of graphical statics. Velocity. Acceleration. Impulse. Impact. Projectile. Motion in a circle. Conical pendulum. Governors. Train on a banked track. Harmonic motion. Principle of energy. Motion about a fixed axis. Compound pendulum.

(d) Computation and Mensuration.—Use of logarithmic table. Application of logarithms to numerical calculation. Theory and use of slide rule. Problems of heights and distances. Solutions of triangles. Mensuration of plane and solid figures. Application of Simpson's rule. Prismoidal formulæ and Guildin's theorem. Calculation of Earthwork.

(e) Graphical methods—Graphs of elementary functions. Determination of law connecting two variables from tabulated values of variables—Graphical solution of equations—Graphic Differentiation and integration.

## (VII) MATHEMATICS—Paper II

(a) Differential Calculus.—Higher derivatives—Leibnitz's theorem—Rolle's theorem—Mean value theorem—Taylor's theorem—Machaurin's theorem—Application to theory of maxima and minima—Numerical evaluation of transcendental functions—Newton's method of Root Extraction—Partial derivatives—Calculus of errors—Taylor's expansion for two or more variables—Maxima and minima of functions of two or more variables.

(b) Integral calculus.—Integration defined as a limit of a sum—Various theorems leading to indefinite integrals—Mean Value Theorem—Various methods of integration. Double integration. Application to determination of areas, volumes, centre of mass and moments of inertia.

(c) Differential Equations.—Linear differential equations. Linear equations of higher order with constant co-efficients. Complementary function. Particular integral. Application to Engineering Problems. Integration in series—Simple Convergence tests. Fourier series.

## (VIII) SURVEYING (Paper)

Chain survey—principles and procedure, equipment and instruments—permissible errors and accuracy. Determination of areas, use of pantograph, planimeter.

Prismatic compass survey—principles and procedure, precautions, use of clinometer and sextant.

Levels and levelling—instruments and their adjustments; accessories; principles of levelling and procedure; precautions; reciprocal levelling and contouring.

Theodolite—The Instrument and its use. Methods of traverse survey and Gale's system. Traverse tables and corrections.

Use of Plane table and its accessories—Triangulation; procedure and three point problem, determination of position; precautions and accuracy.

Curve tracing and setting-out work.

### (IX) SURVEYING (Sessional and Practical)

The practical work will consist of field work and preparation of survey drawings in accordance with the lecture syllabus.

### (X) DETAILS OF CONSTRUCTION AND ESTIMATING

(a) Details of construction.—Building regulations. Sites and foundations. Timbering. Shoring, Scaffolding. Underpinning. Brick and stone masonry. Reinforced concrete and brick work, centres and moulds. Walls, piers and retaining walls. Arches, Vaulting and domes. Lintels and sunshades. Floors and roofs of buildings. Doors, windows and partitions. Carpentry and wooden joints. Staircases. Steel skeleton buildings. Minor bridges.

(b) Estimating.—(i) Standard methods of measurements—approximate and accurate. Taking out quantities and materials of simple buildings, culverts, wells, etc. Pricing. Analysis of rates. Preparation of indent of materials for simple masonry structures. (ii) Weights and costs of machine details.

### (XI) DRAWING (Paper)

Use of Drawing Instruments. Lettering, scales and geometrical drawing. Projections of points, lines, planes and solids. Sections of solids. Intersection of planes.

Development of surfaces of solids. Inter-penetration of solids. Isometric drawing of simple geometrical solids. Drawing of simple buildings with details from models. Colouring.

Drawing of buildings, culverts and engineering constructional details from measurements of actual objects. Isometric drawings of buildings and culverts. Building design from specification.

Orthographic projection of simple machine parts. Free hand sketches and scale drawings of simple machine parts.

Mechanical drawing conventions. Dimensioning of workshop drawings. Screwed fastening. Rivets and rivetted joints.

Locking devices for nuts. Shaft keys ; cotters ; shaft couplings ; shaft bearings ; stuffing boxes ; lubricators ; hangers ; brackets ; valves ; eccentrics ; cross-heads ; connecting rods ; governors. Development of sheet metal work.

## (XII) DRAWING (Sessional)

Sessional work will consist of a number of drawing plates dealing mainly with the subjects mentioned in the theoretical course of the same subject.

## (XIII) HEAT ENGINES, I (Paper)

Properties of Steam.—Steam Generation ; superheating ; condensing. The use of Steam Tables. Boilers ; economisers ; feed-heaters ; feed pumps ; boiler fittings. Boiler losses and efficiencies. Steam calorimeters. Fuels and combustion.

Condensers and Air Pumps.

The Steam Engine.—Its various parts and their functions ; elementary theory and calculations. The indicator ; indicator diagrams ; indicated horse power. Brake Horse power. The slide valve and piston valve ; valve diagrams. Other types of valves. Simple valve gears.

Elementary principles of thermodynamics. Laws of gases. —Operations involving changes in volume, pressure and temperature under various conditions. Internal energy and external work. Ideal and actual engine cycles. Steam engine efficiencies.

Internal Combustion Engines.—Ideal cycles of operation. The four-stroke cycle gas engine ; description, methods of governing, ignition, valve timing, calculation of power and efficiency. Producers and producer gas. The two-stroke cycle engine. The petrol engine ; carburettors. The oil engine ; compression ignition ; blast injection ; airless injection ; fuel systems and governing ; four-stroke and two-stroke types. The Humphrey pump.

## (XIV) HEAT ENGINES, I (Sessional)

Prime Movers Laboratory—Description and testing of the various equipments required in power plant tests. The carrying out of simple tests on engines, boilers and condensers.

## (XV) APPLIED MECHANICS, I AND GRAPHICS (Paper)

Strength of Materials.—Stress, strain, and elasticity. Hooke's Law. Elastic constants. Poisson's ratio. Temperature stresses. Heterogeneous bars under direct stress. Boiler shells.

Testing of materials in tension and compression.—Stress-strain diagrams; limit of proportionality; elastic limit; yield point; ultimate strength; proof stress; working stress; factor of safety. Effect of shape of test piece and its composition. Nature of fracture. Percentage elongation and reduction of area. Standard test pieces. Typical stress strain diagrams for mild steel, wrought iron, cast iron, copper, brass, bronze, aluminium and its alloys. Repetition of stress. Sudden or dynamic loading. Impact. Resilience.

Beams and Bending.—Bending Moment and Shearing Force diagrams for the standard cases of loading on cantilevers and beams freely supported at the ends—Graphical method for drawing the B. M. and S. F. diagrams for any irregular system of loading on cantilevers and freely supported beams. Method of superposition.

Stresses due to bending.—Simple bending. Moment of Resistance. Moment of Inertia. Radius of Gyration.

Section Modulus, Calculation of 'I' and 'Z' for simple cross sections—General method. Graphical method for the determination of 'I'.

Shear stress in beams—Rectangular, circular and girder sections.

Polar moment of inertia.—Simple torsion of shafts.

Earth pressure. Minimum depth of foundations by Rankine's theory.

Graphic Statics.—Stress diagrams; triangular frames and trusses; cranes and derricks; shearlegs and tripods.

Theory of Machines.—Elementary kinematics. Simple mechanisms. Simple machines. Friction between working surfaces; work lost in friction.

Belt drives; Rope drives; friction in belts and ropes; centrifugal force.

Toothed gearing.—Circular and diametral pitch; tooth shapes.

Wheel trains.—Simple and compound; reverted trains; epicyclic trains.

Screw mechanisms.—Worm gears.

Simple cams.

## (XVI) APPLIED MECHANICS I AND GRAPHICS

(Sessional)

Experiments on statics, involving forces at a point or on a body. Moments; couples. Inclined plane. Friction. Centroids.

Simple frames. Simple machines.

**Dynamical experiments.**—Experiments on velocity and acceleration; momentum; kinetic energy; fly wheels; simple and compound pendulums; centrifugal force.

Experiments involving stress and strain.—The straining of wire: Young's modulus. Simple tests of different materials in tension, compression, shear, bending, torsion, impact and hardness.

## (XVII) ELECTRO-TECHNOLOGY (Paper)

Mechanical, Thermal and Electrical Units and Standards.—Simple laws of Electrical circuits. Electro-magnetic forces in induction of E. M. F. Magnetic properties of iron and steel. Conductors and insulators. Secondary cells—acid and alkaline batteries. Wiring for domestic installation and power circuits. I. E. E. rules—Testing of installations and tables for wires and cables. Low and medium pressure distribution—D. C. and A. C. systems.

D. C. machines.—E. M. F. equation, windings, armature reaction and commutation. Generators and motors—series, shunt, compound and separately excited; simple characteristics. Principles of starting and speed control of motors. Determination of efficiency.

A. C. machines and circuits.—Average, maximum, and H. M. S. values of A. C. voltage and current; phase difference; vectorial representation; series and parallel circuits; Power factor; measurement of A. C. power; single-phase and poly-phase circuits. Different types of A. C. machines and their working—Alternators, transformers, synchronous and asynchronous motors, rotary converters and mercury arc rectifiers.

Commercial measuring instruments.—D. C. and A. C. ammeters, voltmeters, wattmeters and integrating meters. Low and high resistance measuring instruments, Ohm-meters, meggers, earth-testers, etc.

## -(XVIII) ELECTRO-TECHNOLOGY

(Sessional and Practical)

Measurement of low and high resistances; calibration of ammeters and voltmeters; different uses of milli-voltmeters and milli-ammeters; fault localisation of electrical circuits; uses of megger and earth-tester; practical house wiring; determination of no-load characteristics of series, shunt, compound and separately excited generators and motors.

## (XIX) SOCIOLOGY AND INDUSTRIAL RELATIONS

(a) *Sociology* :—

Evolution of Family, Tribe, Clan, Nation, State—Private property, Joint Family—Class and Caste—Guilds—Individualism. Socialism, Communism—Rights and duties of the Individual in the modern society and democratic state.

Factors controlling working relations of human beings—general features of social organisation in industrial life—cottage industries and capitalistic enterprise—survey of diverse economic adaptation, social structure and community life—urban and rural environments—city planning—shifting of industries and movements of population—housing, health, education and recreation.

(b) *Industrial Relations* :—

Nature of Labour Recruitment in present day economic life. Factory Labour organisation in India—Wages and methods of remuneration—Time work, piece work, premium bonus, profit sharing, collective bargaining—Trade unions—Strikes and Lockouts—Unemployment—Industrial conciliation and arbitration, Social Insurance.

Government control of Industry—Compulsory arbitration—Labour Legislation—Powers and Acts of Central and Provincial Governments in India—Hours of employment.

(c) *Labour Welfare & Industrial Hygiene* :—

Maintenance of effectiveness of workers—Industrial fatigue—Rhythm and monotony—Rest pause—Causation and prevention of principal industrial diseases—Industrial poisoning, dust control, ventilation and health administration—Plant sanitation—Lighting, atmosphere control, noise, vibration, safety, etc.—Protection of women and children.

## (XX) WORKSHOPS (Sessional)

(a) *Carpentry* :—

Tools—names, care, use and maintenance. The detection of defects in timber : Sawing, Planing, Squaring and Gauging.

Practical examples of various joints used in Carpentry, e.g., Half Lap, Dovetail Notch (various types). Mortice and Tenon (various types). Bridle joint, etc.

(b) *Smithy* :—

Tools—Names, care, use and maintenance.

Use of Anvil—

Construction of Forge and maintenance of Fire.

Practical exercises involving the processes of Jumping, Drawing, Cutting, Bending, Welding, etc., e.g., Hexagonal Bolts. Pipe Hooks Clamps (various types). Chisels (various types).

(c) *Pattern Making Course* :—

Selection of Timber ; Use of contraction Scale ; Construction of various types of Patterns, as for example :—Solid, Built-up, Split, Skeleton, Sweep. etc. Core Boxes of different types.

Exercises on simple types of patterns and Core Boxes of various groups.

(d) *Foundry Course* :—

Composition of Moulding sand ; Simple Green sand ; Moulding and Core making practice using simple patterns. Demonstrations on Dry and Loam Sand Moulding ; Demonstration on Machine Moulding.

Study of the construction of Cupolas. Charging. Melting. Tapping and pouring of Metal.

Fettling of Castings ; Defects of Castings, and Remedies.

Detailed syllabuses of studies in the subject for the B.E. Part I Examination may be modified from time to time by the Syndicate on the recommendation of the Board of Studies in Engineering.

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## CHAPTER LII

### BACHELOR OF ENGINEERING EXAMINATION, Part II

1. The Bachelor of Engineering Part II Examination will be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. The Examination will be held in the following branches :—

(A) Civil Engineering.

(B) Mechanical Engineering.

(C) Electrical Engineering.

(D) Metallurgical Engineering

and the Diploma shall state distinctly in which branch the candidate has qualified.

3. Any Under-graduate or Graduate of the University may be admitted to this Examination, provided he has prosecuted a regular course of study in a College of Engineering affiliated to the standard of B.E. Part II Examination for two academic years in the particular branch in which he presents himself for Examination after passing the B.E. Part I Examination.

A candidate shall not present himself for Examination in any one year in more than one branch of Engineering, but he shall be eligible, after passing in one of the branches of Engineering, for appearing at any of the other branches provided he has prosecuted a fresh course of study prescribed under the Regulations for B.E. Part II of that branch, for a period of two academical years in a College affiliated to the B.E. standard. He shall be excused attendance and Examination in the subjects in which he has previously passed.

4. A candidate may, however, appear in any or all of the subjects mentioned below for the respective branches at the end of the First-year of the B.E. Part II course subject to his completing the course in these subjects and passing the Test examination held by the College immediately preceding the University Examination :—

Such a candidate may obtain credit for those subjects in which he passes when appearing at B.E. Part II Examination.

(A) Civil Engineering—(i) Economics and Accounts, (ii) Applied Mechanics (Strength of Materials), (iii) Geodesy, (iv) Geodesy (Sessional and Practical), (v) Geology, (vi) General Civil Engineering (Paper I). (vii) General Civil Engineering (Paper II), (viii) Structures and Design (Paper I).

(B) Mechanical Engineering—(i) Economics and Accounts, (ii) Applied Mechanics (Strength of Materials), (iii) Metrology, (iv) Metrology (Sessional and Practical), (v) Electro-Technology, (vi) Electro-Technology (Sessional and Practical), (vii) Heat Engines II.

(C) Electrical Engineering—(i) Economics and Accounts, (ii) Applied Mechanics (Strength of Materials), (iii) Heat Engines II, (iv) Heat Engines II (Sessional), (v) Mathematics, (vi) Advanced Electro-Technology.

(D) Metallurgical Engineering—(i) Economics and Accounts, (ii) Refractories, Furnaces and Fuels (Paper); (iii) Refractories, Furnaces and Fuels (Sessional); (iv) Inorganic and Physical Chemistry (Paper); (v) Inorganic and Physical Chemistry (Practical and Sessional); (vi) Geology, Mineralogy, and Dressing of Minerals (Paper); (vii) Geology, Mineralogy and Dressing of Minerals (Sessional); (viii) Electrical Engineering.

5. In order to pass the B.E. Part II Examination a candidate must obtain 40 per cent. of the full marks of each subject and half of the aggregate. In order to be placed in the First Class, a candidate must obtain two-thirds of the aggregate marks of the B.E. Part II Examination. A successful candidate getting less than two-thirds will be placed in the Second Class. The candidate who is placed first in the First Class in each branch shall receive a gold medal and a prize of books to the value of Rs. 200, provided that he has not taken more than 2 years in passing the B.E. Part II Examination after passing Part I.

6. A candidate must pass Part II of the B.E. Examination within four years of the date of his admission to the Part II course, provided that in his Fourth year he appears as a non-collegiate candidate. A candidate may, however, be permitted to appear after four years as a non-collegiate candidate if he is specially recommended by the Principal of his College.

7. Every candidate for admission to the B.E. Part II Examination in whole or in part shall send to the Registrar his application in the form prescribed by the Syndicate together with a fee of Rs. 50 at least a month before the date fixed for the commencement of the Examination.

A candidate who fails to pass or to present himself for the Examination shall not be entitled to a refund of the fee.

8. A candidate who fails in one subject only and by not more than five per cent. of the full marks in that subject, but has shown merit by gaining sixty per cent. or more in the aggregate marks of the Examination shall be allowed to pass.

9. If the Board of Examiners are of opinion that in the case of any candidate not covered by the preceding regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject or in the aggregate, they shall report the case to the Syndicate, and the Syndicate may pass such a candidate.

10. As soon as possible after the B.E. Part II Examination the Syndicate shall publish a list, arranged in two classes, in order of merit, of those who have passed the B.E. Part II Examination in each branch. Every candidate on passing shall receive a Diploma in the form prescribed in Appendix A.

11. Graduates in Engineering will be required to undergo Practical training for one year in an approved Engineering Establishment after completing their Degree Course.

12. The subjects prescribed for the B.E. Part II Examination and distribution of marks in the respective branches of Engineering are as follows :—

(A) Civil Engineering

	<i>Marks.</i>
(i) Economics and Accounts .. ..	100
(ii) Applied Mechanics (Strength of Materials) ..	100
(iii) Geodesy (Paper) .. ..	100
(iv) Do. (Sessional & Practical) .. ..	100
(v) Geology .. ..	100
(vi) General Civil Engineering (Paper I) ..	100
(vii) Do. (Paper II) .. ..	100
(viii) Structures and Designs (Paper I) ..	150
(ix) Do. (Paper II) .. ..	150
(x) Do. (Sessional) .. ..	100
(xi) Applied Mechanics (Hydraulics) .. ..	150
(xii) Do. (Sessional) .. ..	100
(xiii) Planning, Layout and Estimating ..	150
(xiv) Elective .. ..	200
(xv) Project and Thesis (Sessional) .. ..	300
Total ..	2,000

Electives :— (a) Railway and Highway Engineering  
 or, (b) Sanitary Engineering  
 or, (c) Irrigation and Flood Control  
 or, (d) Water Power Engineering  
 or, (e) Advanced Building Construction and  
 Architectural Design.

## (B) Mechanical Engineering

	<i>Marks.</i>
(i) Economics and Accounts .. ..	100
(ii) Applied Mechanics (Strength of Materials) ..	100
(iii) Metrology .. ..	100
(iv) Metrology (Sessional and Practical) ..	50
(v) Electro Technology (Paper) .. ..	100
(vi) Electro-Technology (Sessional and Practical)	50
(vii) Heat Engines II .. ..	100
(viii) Heat Engines III .. ..	100
(ix) Do. (Sessional) .. ..	50
(x) Applied Mechanics (Theory of Machines) ..	150
(xi) Do. (Hydraulics) .. ..	150
(xii) Do. (Sessional) .. ..	100
(xiii) Works Organization and Management ..	100
(xiv) Workshop Theory .. ..	100
(xv) Drawing and Design .. ..	150
(xvi) Elective .. ..	200
(xvii) Project and Thesis (Sessional) .. ..	300
Total ..	2,000

Electives :— (a) Production of Engineering  
or, (b) Machine Tools  
or, (c) Automobile Engineering  
or, (d) Refrigeration and Air-Conditioning.

## (C) Electrical Engineering

	<i>Marks.</i>
(i) Economics and Accounts .. ..	100
(ii) Applied Mechanics (Strength of Materials) ..	100
(iii) Heat Engines II (Paper) .. ..	100
(iv) Do. (Sessional) .. ..	50
(v) Mathematics .. ..	100
(vi) Advanced Electro-Technology .. ..	150
(vii) Electrical Machines (Paper) .. ..	100
(viii) Do. (Sessional) .. ..	100
(ix) Switchgears and Instruments .. ..	100
(x) Do. (Sessional) .. ..	50
(xi) Applied Mechanics (Hydraulics) .. ..	150
(xii) Do. (Sessional) .. ..	100
(xiii) Works Organisation and Management ..	100
(xiv) Transmission and Distribution of Electrical Power	100
(xv) Planning and Design of Power Systems ..	100
(xvi) Elective .. ..	200
(xvii) Project and Thesis (Sessional) .. ..	300
Total ..	2,000

Electives :— (a) Electrical Communication  
or, (b) Electric Traction  
or, (c) Illumination Engineering  
or, (d) Hydro-electric Plants

(D) Metallurgical Engineering

	<i>Marks.</i>
(i) Economics and Accounts .. ..	100
(ii) Refractories, Furnaces and Fuels (Paper) ..	100
(iii) Do. Do. (Sessional) ..	50
(iv) Inorganic and Physical Chemistry (Paper) ..	100
(v) Do. Do. (Sessional and Practical) ..	50
(vi) Geology, Mineralogy and Dressing of Materials (Paper) .. ..	100
(vii) Do. (Sessional) .. ..	50
(viii) Electrical Engineering .. ..	100
(ix) Metallurgy of Iron and Steel .. ..	200
(x) Metallurgy of Non-ferrous Metals .. ..	100
(xi) Assaying and Metallurgical Analysis (Paper) ..	50
(xii) Do. (Sessional and Practical) .. ..	100
(xiii) Works Organisation and Management .. ..	100
(xiv) Electro-Metallurgy and Mechanical Working and Testing of Metals .. ..	100
(xv) Do. (Sessional) .. ..	50
(xvi) Metallography Heat Treatment and Pyrometry (Paper) .. ..	100
(xvii) Do. (Sessional and Practical) .. ..	100
(xviii) Elective .. ..	150
(xix) Project and Thesis (Sessional) .. ..	300
Total ..	2,000

Electives :— (a) Advanced Metallurgy of Alloy Steel  
or, (b) Advanced Metallurgy of non-ferrous Alloys  
or, (c) X-ray-crystallography and Spectroscopy of Metals and Alloys.

13. The limits of subjects for the different branches are as follows :—

(A) CIVIL ENGINEERING

A (I) Economics and Accounts

Economics.—A brief sketch of the economic system of present day Production and Distribution, with special reference to Indian conditions in domestic and international aspects.

**Wealth and Prosperity.**—Demand and Supply of goods. Agents in Production. Raw materials and resources of Industry. Supply of Labour. Standard of Living. Efficiency and wages. Industrial evolution. Machinery and capitalistic enterprise. Industrial organisation. Localisation of Industry. Monopolies and trusts. Rationalisation. Partnerships and Jointstock Companies. Managing agencies. Financial organisation. Provision of capital. Shares and debentures. Wages and profits. Factory and Office management. Depreciation. Insurance.

**Value & Exchange.** Markets. Joint and Composite Demand and Supply. Money and Credit. Index Numbers. Banking. Domestic and International Trade. Foreign Exchanges. Taxation.

**Book-Keeping and Accounts.** The Journal, Cash Book, Purchase Book, Sale Book, Ledger. Double Entry, Balancing. Trial Balance, Balance Sheet. Bad debts. Trading and Profit and Loss Accounts. Auditing.

**Financial statement.** Valuation and depreciation. Principles of Industrial Accounting. Costing and Estimating. Prime costs. Wages and material. Oncosts and their determination. Control of expenditure—authorisation and budget.

**Specifications**—Specifications for inviting Tenders; information to be given on preliminary inquiry and on placing the orders; contracts for supply; erection; guarantee, and acceptance; standard forms of Contracts.

Interpretation of financial statements in which Engineering students who enter business will be interested. A description of the Book-keeping methods is to be presented (but not in great detail) so as to enable an average student to keep a set of Business Books. Emphasis will be placed on the study of actual business problems.

## A (II) APPLIED MECHANICS (Strength of Materials) (Paper)

**Compound stresses and strains.**—Ellipse of stress. Principal stresses; principal planes. Thick cylinders and spheres. Compound cylinders. Force and shrink fits. Rotating rings and discs. Alternating stresses. Fatigue. Effect of temperature on the strength of materials; high temperature-resisting steels; plastics. Overstrain. Creep. Growth of castings.

**Beams with unsymmetrical cross-section; momental ellipse.** Flitched beams, Flanged girders, Reinforced concrete beams.

**Moving loads.**—Standard cases; maximum bending-moment and maximum shearing-force diagrams; equivalent uniformly-distributed load for a series of wheel loads.

**Deflection of beams.**—Cantilevers and freely supported beams with concentrated and distributed loads. Macaulay's

method. Mohr's theorem and its applications. Propped beams. Graphical methods for the determination of deflection.

Encastre beams.—Symmetrical and unsymmetrical loading conditions—General case. Beams fixed at one end and freely supported at the other—General case. Variation in level of supports.

Continuous beams. Theorem of Three Moments. Semi-Graphical treatment. Characteristic points.

Combined bending and direct stress.

Columns and struts—Crippling load, slenderness ratio. Euler's formula, columns with eccentric loads, columns with initial curvature. Equivalent eccentricity. Perry strut formula. Empirical formulae—Rankine's formula, straight line formula, Johnson's parabolic formula and other formulae.

Shear in columns.

Laterally loaded columns and tie bars.

The shear centre. Non-Uniplanar bending. Curved beams. Crane hooks ; rings ; links.

Torsion.—Torsion and bending combined. Stresses in crank shafts. Torsion of non-circular cross-sections.

Springs.—Carriage springs. Close-coiled cylindrical spiral springs. Open coiled cylindrical spiral springs.

Strain energy.—Deflection due to bending and due to shear and deflection of framed structures by the strain energy theory.

Elastic vibrations. Transverse, longitudinal, and torsional vibrations. Whirling of shafts ; critical speeds.

Methods of testing and appliances used in determining the elastic constants and in testing materials to destruction under tension, compression, shearing, torsion and bending. Impact and hardness tests. Effect of rate of loading, overstrain and heat-treatment. Some knowledge of the principal experimental work on the testing of materials. An elementary knowledge of the physical properties of the common materials used in Engineering.

### A (III) GEODESY (Paper)

Surveying.—Various causes of errors in levelling. Elimination of such errors. Customary limits for errors. Theory and use of the stadia method of plane-tabling with levelled heights and reduction of distances and heights by slide-rule. The three point problem of plane-tabling resection from within and without the triangle. Geometrical and trigonometrical proof of the three-point problem: The two point problem with and without the magnetic compass. Triangulation with reciprocal value ; heights of stations : base line measurements. Finding values of position by observations to three known points.

Contouring of the triangulated areas by heights calculated from the reduced levels. The location of the map of a road, railway, canal, or weir, etc. The general principles of tunnel alignment and of carrying surface meridians underground for mine-surveys. Discussion on the latest patterns of instruments.

**Practical Astronomy:**—Introduction to spherical trigonometry up to the solution of the spherical triangle, and the adaptation of Napier's rules of circular parts. Definitions; systems of celestial co-ordinates; the seasons for sidereal, sun, and mean time; acceleration, retardation and equation of time. The Julian and Gregorian calendars, and the various astronomical corrections.

Finding the meridian of a place by observations of the sun or at upper culmination by equal altitudes, by the sun or stars not in the meridian and by circumpolar stars at elongation, and finding time by the sun or stars on the meridian and ex-meridian, finding latitude by polaries and circum-meridional observations. Use and construction of sun-dials.

**Railway Curves and Alignments.**—Theory of curves. Curves laid out with the aid of angular instrument; with one theodolite. Curve by ordinates from the long chord. Curve with certain given data to pass through a ruling point. Compound curves. Diversion curve. Vertical curves. Curve spiral or transition curve. Double-centre method for laying-out straight line.

#### A (IV) GEODESY (Sessional and Practical)

The course is mainly based on subjects mentioned in the theoretical syllabus.

#### (A) (V) GEOLOGY

(a) **Physical Geology.**—A general view of the earth. Rocks and minerals. General character of igneous, sedimentary and metamorphic rocks. Weathering and disintegration of rocks by atmospheric agents. Denudation by rivers, glaciers, wind and seas. Results of weathering. Deposition of detritus. Consolidation of sediments: lamination and stratification. Volcanoes: form structure and products; types of eruption. Mode of occurrence of igneous rocks, dykes, sills, necks or piles, laccoliths and batholiths. Secular movements of the earth's crust. Earthquakes.

(b) **Structural Geology.**—Results of crustal movements; folding of strata, folds, dips, strikes. Fracturing; normal and reverse faults, hade, throw and heave, dip and strike faults, and their effects on outcrops; step, trough and ridge faults; origin of faults. Joints and cleavage planes. Relation of folds,



faulting, and joints to Engineering work. Conformable and unconformable strata. Overlap. Outcrops: effects of topography on outcrops; tracing of outcrops, thickness of strata and their measurements.

(To be accompanied by exercises in constructing geological sections, solution of problems in geological structures, and practice in reading geological maps.)

(c) Palaeontological Geology.—Fossils: their mode of preservation; rocks in which they occur. Importance of fossils in stratigraphical geology.

(d) Stratigraphical Geology.—Leading principles of stratigraphy. A brief outline of Indian stratigraphy.

(e) Petrology.—Igneous rocks—Texture, relation of texture to mode of occurrence. Classification. Character and essential constituents of the more important igneous rocks.

Sedimentary rocks.—Characteristics. Mode of origin and classification. General description of the different sedimentary rocks.

Metamorphic rocks.—Kinds of metamorphism. Characteristic structures. General description of the commoner kinds of metamorphic rocks.

(To be accompanied by exercises in the recognition of rocks from hand specimens.)

(f) Crystallography.—Symmetry, Systems and their symmetry.

(g) Mineralogy.—Physical properties of minerals in general. Particular description of the following minerals:—native elements; graphite, diamond, gold. Sulphides:—pyrite, galena, sphalerite, chalcopyrite. Oxides:—Quartz, corundum, magnetite, hematite, limonite, braunite, pyrolusite, psilomelane, chromite, cassiterite, bauxite, laterite.

Oxysalts—Carbonates—calcite, dolomite, magnesite. Sulphates—gypsum. Phosphates—apatite. Silicates—Feldspar group, feldspathoid group, pyroxene group, amphibole group, olivine, muscovite, talc, serpentine.

(h) Ore-deposits.—Form origin and classification of ore-deposits. Enrichment of ore-deposits.

(i) Engineering Geology:—Road metal, ballast, building stones. Surface and underground water supply. Dams and reservoirs. Tunnels and cuttings. Foundations, building sites. Stability of hill slopes. Quarrying. Protection of coast and river banks from erosion.

## A (VI) GENERAL CIVIL ENGINEERING (Paper I)

Roads and Railways.—Different classes of roads. Survey, construction and maintenance of metalled and unmetalled roads. Hill roads. Culverts and bridges. Survey, location and pre-

paration of Railway Project. Earthwork and permanent-way materials. Standard dimensions. Tunnels and bridges.

### A (VII) GENERAL CIVIL ENGINEERING (Paper II)

**Sanitary Engineering.**—Drainage and sewerage. Introductory definitions and discussions. Historical review. Systems of sewerage, combined and separate sewers and drains—sewer materials and cross-sections. Computation for flow in sewers and drains. House drainage—description of fittings of sanitary engineering and plumbing equipment. Public latrines and urinals. Sewage disposal—treatment of sewage. Selection of site for disposal works.

**Water Supply.**—Historical Review. Value and importance of a public water supply. Consumption of water for different purposes. Sources of supply. Relation of rainfall to water supply. Works for the collection, purification, and distribution of water.

**Irrigation.**—Introductory definitions and discussions. Functions of irrigation works. Lift irrigation—Methods of raising water from low-lying depressions and wells. Gravity irrigation—classification of canals. Design and requirements of different types of canals. Survey for selection of alignments of canals. Headworks—Description and selection of site. Works—Description of escapes, falls, rapids, etc. Drainage and training works.

### A (VIII) STRUCTURES AND DESIGN (Paper I)

**Framed structures.** Clark Maxwell's reciprocal theorem. Method of sections. Stress analysis of statically determinate space frames. Method of tension co-efficients. Williot Mohr diagrams for deflection of framed structures. Shear legs, tripods and derrick cranes.

**Influence lines** for simple beams. Position of wheel loads for maximum bending moment, shear and reaction. Equivalent uniformly distributed load—graphical method.

**Riveted joints** and connections of structural members. Torsion in a group of rivets. Tension in rivets. Some knowledge of experiments on riveted joints.

**Working stresses.** Factor of safety. Structural steel work.

**Design of tension members.** Stiffties. Net area of tension members.

**Design of compression members.** Asimont's device columns for buildings. Batten plates.

**Design of beams** and built-up girders. Gantry girders.

**Masonry structures.** Piers and buttresses. Reservoir walls. Walls and chimneys.

**Foundations.** Masonry footings and grillages.

Reinforced concrete. Columns and rectangular freely supported beams and slabs. Design of small foundation blocks.

General details and design of a steel roof truss, a built-up gantry girder and a steel frame building.

## A (IX) STRUCTURES AND DESIGN (Paper II)

Structures.—Three-pinned parabolic, semi-elliptic, and segmental arches. Influence lines for three-pinned arches. Application of the strain-energy theory to frames. Stresses in redundant frames and statically indeterminate structures. Elastic theory of Arches. Influence lines for two-hinged and rigid arches.

Masonry arches.—Masonry dams, gravity dams and arched dams. Uplift, experimental determination of stresses in dams.

Foundations—Types of foundations, footings, inverted arches, grillages, pile foundations, sheet piling and cylinder and caisson foundations. Soil mechanics.

Reinforced concrete.—Simple and doubly reinforced concrete rectangular beams, steel-beam theory, Tee-beams.

Shear, bond and diagonal tension, its nature, evaluation and location of reinforcement.

Equivalent moment of Inertia of reinforced concrete sections.

Slabs and continuous beams.

Columns with concentric and eccentric loads.

Slab foundations, combined footings, cantilever and counterfort retaining walls.

Design of compression members. Bridge compression members. Lattice bracing and batten plates.

Influence lines for panelled girders, for braced girder with parallel flanges and curved flanges. Influence lines for fixed and continuous beams. Girder bridge construction—main girders, floor system and the secondary bracing. Fixed and opening types of bridges.

Suspension bridges. Continuous girder and cantilever bridges. Influence lines for cantilever bridges.

Portal bracing with hinged and fixed bases; braced portals. Portals carrying lateral loads.

Analysis of stiff-joined frames. Secondary stresses in framed structures. Experimental analysis of stresses in frames.

Theories of Earth-pressure.—Stress analysis of retaining walls and dams. General details and design of structures in appropriate materials (steel, masonry, concrete, etc.) such as fixed and opening types of bridges, building frames and floors, piers and columns, pylons and masts, footings and foundations, combined footings, hinged and fixed arches, tunnel and culvert sections, dams, retaining walls, chimneys, storage bins, staircases, domes, etc.

## A (X) STRUCTURES AND DESIGN (Sessional)

The course is mainly based on subjects mentioned in the syllabus for Structures and Design—Papers I and II.

## A (XI) APPLIED MECHANICS (Hydraulics)

Fluid pressure, its transmission and measurement. Nature and action of simple hydraulic machines. Density, Specific gravity. Atmospheric pressure; Barometers, syphons, pressure gauges; resultant pressure, centre of pressure, pressure on lock gates and dams. Buoyancy and metacentre.

Velocity and volume of flow. Principle of continuity, stream line and eddy flow, fluid acting on a piston, hydraulic head, Bernoulli's theorem. Venturi meters, Radial flow, Centrifugal head impressed on a revolving liquid, the pitot tube.

Flow of water through small and large orifices—Coefficient of velocity—Coefficient of contraction—Coefficient of discharge—relations between them and experimental determination—Drowned orifices, time of emptying tanks through orifices, Losses of head of flowing water due to sudden enlargement, sudden contraction and due to obstruction. Mouth pieces, Cylindrical, Convergent, Divergent and Borda's.

Flow over rectangular, triangular and trapezoidal notches and over weirs. Velocity of approach. Francis's formula—time of emptying reservoirs with rectangular weirs, submerged weirs,—practical cases. Anicuts with clear overfall, drowned anicuts; head sluices, discharge through bridge openings, afflux and backwater. Designing canal locks.

Fluid friction and flow through pipes—variation of coefficient with velocity and diameter—Froude's and Unwin's experiments—Darcy's formula, hydraulic mean depth, hydraulic gradient, ordinary calculations of size of pipes and volume of discharge. Loss of head due to bends and elbows. Parallel flow through pipes; time of emptying tank through a pipe; transmission of power through pipes; flow through nozzles; hammer blow in pipes.

Flow through open channels; economical section; Chezy, Bazin, Kutter and other formulae. Discharge of measured quantities of water for irrigation purposes; Italian and Spanish modules; other forms of apparatus answering the same purpose. Separating weirs. Variation of velocity in a cross section. Measurement of flow of irregular channels. Standing waves.

Pressure of a jet on a plane surface, fixed or moving. Energy communicated to the moving surface, and efficiency of jet. Velocity of surface for maximum efficiency. Resultant pressure on a curved surface. Direct impulse and re-action. Condition to avoid loss by shock when jet is received. Condi-

tion for least loss of kinetic energy when jet is discharged. Propulsion of ships by jet.

Impulse and reaction turbines. The Francis turbine. Mixed flow turbines. Axial flow turbines; the high specific speed turbine. The Pelton wheel. Nozzles; buckets. Design of guide blades and vanes. Cavitation. Modern research on turbine design. Governing, efficiency tests, specific speed, and characteristic curves. Principle of similarity applied to turbines.

Centrifugal pumps.—Design of vanes, centrifugal heads; lowest speed to begin pumping. Specific speed, characteristic curves, principle of similarity, least diameter of impeller, multi-stage pumps.

Reciprocating pumps, effects of cavitation in reciprocating pumps, diagrams of effective pressure. Methods of driving reciprocating pumps.

Other types of pumps, including the airlift pump and the Shones ejector.

Hydraulic accumulators, intensifiers, lifts, cranes, riveters, presses.

Hydraulic couplings and dynamometers.

### A (XII) APPLIED MECHANICS (Sessional)

Strength of Materials.—More advanced testing of materials.

Hydraulics.—Experiments illustrating Bernoulli's theorem. Experiments on orifices, notches, flow in pipes and channels. Tests on turbines and pumps.

Theory of Machines.—More advanced experiments on machines; balancing.

### A (XIII) PLANNING, LAY-OUT, AND ESTIMATING

#### (a) Planning & Lay-out :—

General considerations and requirements, site and its influence, orientation, local regulations about open space, height, ventilation, etc., entrance, exit, stair, lift, sanitary accommodation, electrical equipment. Fire protection, water supply, and drainage. General specification. Arrangement of work site and equipment. Forms of contract. Arbitration and fees.

#### (b) Estimating :—

General principles of cubing and pricing; standard methods of measurement. Method of procedure,—Taking off, Marking, Headings. Abstracting, Costing,—Reducing, and Billing. Variation and Accounts. Schedule of prices. (Students will have to survey a complete building including steel work, plumbing, electrical installation). General principles of valuation and rental, and cost of land and building. Belting. Leasehold.

## A (XIV) ELECTIVE

### A (a) RAIL AND HIGHWAY ENGINEERING

#### (a) Railways :—

Indian Railways, system of construction and working. Electric Railways. Gauge.

Earth work and cutting, drainage, land width, ballast.

Various kinds of road crossings—Level, overbridges, under-bridges and subways.

Mechanical principles, Resistances—Grade, curve, wind and special. Compensation for curvature. Ruling gradient, superelevation. Tractive force, transition and vertical curves.

Permanent way, rails—different shapes and length, chairs, fishplates and fastenings, sleepers—wooden, metal and reinforced concrete, advantages and disadvantages. Points, crossings and connected terms, diamond crossings, double slip, single slip. Scissors, Calculations. Creep—its causes and remedies.

Station machinery. Engine sheds, turn-tables, watering arrangements, cabins, weigh bridges, etc.

Station buildings and passenger platforms, waiting halls, overhead sheds.

Station yards, simple way-side traffic yards, loco yards, signalling, interlocking, elementary principles.

Selection of new lines, points to be borne in mind—final location and construction, rules of Government of India.

Bridges, impact, erection of girders, arch and reinforced concrete slab bridges, design of railway bridges, codes of practice, welding in bridge work.

Maintenance, accidents, floods, general rules and standard dimensions.

#### (b) Highways :—

Fundamentals of highway engineering—types and properties of the materials employed, location, curves and grades, air port and highway drainage, theory of soil stabilization, design of pavements of both flexible and rigid types and air-port runways.

The determination of the physical properties of subsoil, bituminous and non-bituminous materials of construction, interpretation of test results, specifications, the design of soil and bituminous paving mixtures.

### A (b) SANITARY ENGINEERING

#### (a) Water supply :—

Sources of supply.—Catchment areas; rivers; lakes, springs; masonry wells; tube-wells; rainfall observation, compensation water; gauging streams.

**Reservoirs.**—Impounding; storage and service reservoirs; water towers; stability of sites.

**Quality of water.**—Impurities of various kinds, organic and inorganic; chemical and bacteriological examination of water; collection and care of samples; interpretation of analytical reports; hardness.

**Water-works.**—Intakes; settling tanks; slow-sand filters; mechanical filters; water softeners; iron eliminators; rates of filtration; coagulation apparatus; chlorination apparatus.

**Conveyance of water.**—Rising mains; distribution mains; strength of different kinds of pipes; loss of head; hydraulic gradient; pressure control and zoning system; house connections; hot water supply; use of meters; use of house and roadside cisterns; valves; expansion joints.

**Pumping installations.**—General types of installation; steam, oil or electric drive tube-well pumps; house pumps; sewage pumps.

**(b) Sewerage :—**

**Sewerage systems.**—Combined or separate sewers, their construction and ventilation; self-cleaning velocity; manholes; dumping chutes, interceptor gulley pits; flushing chambers.

**House drainage.**—Sanitary fillings; traps; soil and anti-siphonage pipes; drain testing.

**(c) Sewage Disposal :—**

**Refuse removal and disposal.**—Reclamation of waste ground; incineration, river pollution and its effects.

The chemistry of sewage.

Disposal by irrigation; sewage farms.

Sea discharge; retention tanks.

**(d) Purification of Sewage :—**

**Chemical precipitation;** liquefaction of sewage; sewage oxidation, septic tanks; contact beds; trickling filters and distributors; activated sludge process; simplex and bio-aeration processes; mechanical desludging; sludge digestion; utilisation of sludge gas, sludge drying beds; mechanical screening; disposal of septic tank effluent by irrigation, dilution subsoil galleries, or wells.

**(e) Surface Drainage :—**

**Rainfall to be dealt with;** selection of outfalls; time of concentration; design of gradients; types of surface drains; "kutchha" and "pucca"; culverts; flood flush drainage and mosquito control.

**(f) Ventilation :—**

**The scientific basis of ventilation;** industrial pollution of the atmosphere; natural and artificial ventilation; ventilation of auditoriums, factories, mines, air conditioning.

### A (c) IRRIGATION AND FLOOD CONTROL

#### (a) Irrigation :—

Irrigation by 'Lift and Flow.'

Different methods of Lift Irrigation from wells, tube-wells and rivers by means of man, animal, wind, steam, gas and electric power.

Flow Irrigation.—(a) from rivers by inundation, (b) from rivers, tanks or reservoirs, by means of dams, weirs or barrages. Dams.

Control.—Distribution and regulation of water supply. Losses of water in transit and methods of reducing the same. Duty of water. Measurement of water.

Canal cross drainage works.—Application of Hydro-electricity of Irrigation. Irrigation surveys and projects. Benefits of Irrigation.

River training and control by embankments, spurs, revetments, bell-bunds, dredging.

Flood protection by embankments and reclamation. Effect of tides and floods in Deltaic Tracts. Uses and evils of embankments.

Over-irrigation and its evils. Necessity of drainage in irrigated, deltaic and tidal tracts. Preparation of drainage projects in tidal and upland areas.

Navigation and its importance.—Navigable canals and canalised rivers for tidal and non-tidal areas.

Disposal of cross-drainages.

#### (b) Flood Control :—

A study of the hydraulic factor affecting river flow, the theory of bed load transportation and means of improving rivers as regards flood. Analysis of stream flow data, and frequency and magnitude of flood flows and the effect of reservoirs in reducing them. Elements of design of dams, water-way and power house; cost and value of water power and flood control including flood damages and the selection and planning of reservoirs for flood control.

### A (d) WATER POWER ENGINEERING

A study of the basic theory of the occurrence and distribution of water on the surface of the earth. Precipitation, run off, infiltration, water losses and their relations, analysis of stream flow data and frequency and magnitude of flood flows and the effect of reservoirs in reducing them.

A study of the problems involved in the location, design, construction and economics of hydroelectric developments as a foundation for practice in this field. Estimates of water power from stream flow data; theory and practice of hydraulic turbines;



elements of design of dam, water way and power house ; cost and value of water power and flood control ; flood damages and the selection and planning of reservoirs for flood control.

*N.B.*—The course includes the study and design of the various portions of some water power project at a site where actual data are available from surveys and reports. Other general problems of power development should also be considered with their basic theory and practice.

### A (e) ADVANCED BUILDING CONSTRUCTION AND ARCHITECTURAL DESIGN

Advanced Building Construction :—

Modern materials of construction.—Non-ferous metals and alloys ; Plastics ; Timber substitutes ; Asbestos building boards ; Decorative finish,—Plaster, paint, varnish, distemper and spray painting, Modern building fittings.

Construction.—System of construction, false work, steel forms, Distributed foundation, protection of basement wall, sub-soil drains, Ventilation and air conditioning, Heat and Sound insulation. Fire and earthquake resisting construction. Ornamental plaster, metal and decorative work.

Architectural Design :—

History of architectural design. Lectures, briefly summarising the various types of 'Orders,' materials, designs and construction used in :—

- (i) Preliminary Classic Styles.
- (ii) Greek Architecture.
- (iii) Roman Architecture.
- (iv) Byzantine and Saracenic Architecture.
- (v) Romanesque Architecture.
- (vi) Gothic Architecture.
- (vii) Renaissance Architecture.
- (viii) Indian Architecture.

Principles of Composition —Unity, mass, contrast in form and mass. Expression of character in design ; proportion ; scale ; Expression of function.

Modern Architectural Design.—Theory of Architecture (Planning, Proportions, etc.). Applied Problems in Design.

Drawing.—Perspective Drawing, Freehand sketching.

Modern design and development of residential buildings, public places, factories, libraries, town halls, theatres, and cinemas.

### A (XV) PROJECT AND THESIS (Sessional)

Students will be required to prepare designs in the drawings and estimate for Civil Engineering projects and write reports on the same.

## (B) MECHANICAL ENGINEERING

### B (I) ECONOMICS AND ACCOUNTS

### B (II) APPLIED MECHANICS (Strength of Materials)

The Syllabuses for these subjects are as prescribed for the Civil Engineering Examination (Part II).

### B (III) METROLOGY

Measurement : direct and indirect methods. Standards of length. Scales. Simple measuring instruments : verniers : micrometers—outside, inside, depth gauges. Dial gauges : Minimeters. Feeler gauges. Slip gauges. Length standards and their preparation. Comparators. Measuring machines. Optical methods of measurement. Surface plates and their preparation.

Instruments for measuring angles : the checking of squares : the sine bar : other methods of setting up work at given angles. Precision spirit levels.

Precision measurement of the diameters of holes and of cylindrical plug gauges : also the checking of internal and external tapers. The checking of curved surfaces and templates.

Limits and fits : unilateral and bilateral systems : hole and shaft bases. Standard systems of limits and fits. Limit gauges—inside and outside, fixed and adjustable. Workshop and inspection gauges. Gauge tolerances.

Selective assembly.

Methods of measuring the various elements of a screw thread. Limit gauges for screw threads. The measuring of gear wheel teeth.

Jigs and fixtures—their use, main features of construction, and elements of design.

The production of precision surfaces : heat treatment ; warping ; growth : grinding : scraping : lapping.

Methods of checking the accuracy of construction and alignment of machine tools.

### B (IV) METROLOGY (Sessional and Practical)

The use of the various precision instruments and machines, mentioned in the lecture syllabus. The checking of instruments and gauges, and the accurate measurement of precision parts of various shapes.

## B (V) ELECTRO-TECHNOLOGY (Paper)

D. C. machines.—Armature windings—Lap and Wave simple and complex; equalising rings. Detailed study of no-load and load characteristics of generators and motors. Theory and construction of starters; different methods of speed control of motors. Parallel and series running of generators and motors. Testing—determination of losses, efficiency, temperature rise, insulation, etc. Balances—static and rotary types.

Alternating current—Comparison of single-phase and poly-phase systems; measurement of power in poly-phase systems, solution of problems on circuits by mathematical and symbolic methods; balanced and unbalanced circuits.

Detailed study of alternators and transformers.—E. M. F. equation; windings; determination of regulation and efficiency. Induction motors—rotating magnetic field; squirrel cage and slip-ring motors; circle, diagram; methods of starting. Main working principles of synchronous motors, rotary converters and mercury arc rectifiers.

## B (VI) ELECTRO-TECHNOLOGY (Sessional and Practical)

Measurement of self-inductance, mutual inductance, and capacitance. Measurement of flux and hysteresis loss; uses of Siemen's electro-dynamometer and Kelvin's balance for measurement of current, voltage and power. Measurement of insulation resistance of cables.

Determination of load characteristics of D. C. motors and generators. Efficiency tests on D. C. motors and generators. Determination of no-load and load characteristics of alternators, transformers, induction motors and rotary converters. Efficiency tests on alternators, transformers, induction motors and rotary converters. Study of the effects of inductance and capacitance on A. C. circuits.

## B (VII) HEAT ENGINES II

Entropy—Entropy of gases; changes of entropy under various conditions. Entropy of steam; calculation of changes in entropy of water, saturated steam, and superheated steam. Temperature-entropy and heat-entropy diagrams for steam: various operations on entropy charts. The Carnot and Rankine cycles on entropy charts. Rankine cycle for superheated steam. Application of entropy charts to steam engine problems.

Steam consumption.—Indicated weight of steam; missing quantity; transference of indicator diagram on to the temperature-entropy diagram. Relation between steam consumption and power, Condensation. Leakage. Steam jacketing. Superheating.

Multiple expansion engines. Different types. Calculation of cylinder dimensions; equalisation of piston loads and of work done in the cylinders. Methods of varying the power; valve gears; starting valves. Combination of indicator diagrams.

Theory of the flow of steam through orifices and nozzles. Injectors. Ejectors.

Steam Turbines.—General principles, description, and classification. Calculation of nozzle dimensions; nozzle details. The simple impulse turbine; velocity diagrams, efficiency, and power. Velocity-compounding and pressure-compounding; pressure and velocity curves. Blading; diaphragms; glands; balancing; governing. Turbine losses and efficiencies. The reaction or pressure turbine: theory and mechanical details. Composite turbines. Multi-stage turbines.

Regenerative feed-heating.

Internal Combustion Engines.—Ideal and actual cycles and their efficiencies. Process of combustion; effect of compression; turbulence; pre-ignition; detonation; effect of design of combustion chamber. Fuels; dopes; octane and cetane numbers. Mixture strength; carburation; supercharging. Ignition systems.

Combustion chambers, atomisers, and fuel pumps for compression-ignition engines. Governing.

### B (VIII) HEAT ENGINES III

The testing of power plant; standard methods of tabulating data, readings and results. Testing equipment; modern types of indicators, dynamometers, and steam calorimeters. Analysis of indicator diagrams; detection of faults in engine and indicator. Valve setting. Fuel sampling and testing for solid, liquid, and gaseous fuels; analysis and calorific value. Other properties of liquid fuels. Sampling and analysis of flue gases and exhaust gases.

#### *Heat Transmission :—*

Theory of heat transmission: application to feed heaters, air heaters, boilers, and condensers. Cyclical heat flow in engine cylinder walls.

#### *Steam Turbines :—*

Exhaust steam turbines. Mixed flow machines. Back pressure and pass-out turbines. Effect of pressure, superheat and vacuum on efficiency.

Binary vapour engines and turbines.

*Air Compressors and Motors :—*

Transmission of power by compressed air. Simple compressors. Two-stage and three-stage types. Calculation of power, dimensions of cylinders, and efficiency; effect of clearance. Similarly for air motors. Preheating; overall efficiency; mechanical details; Centrifugal and Axial-flow compressors.

*Refrigeration :—*

Air-compression refrigerators. Vapour-compression machines. Comparison of working fluids; calculation of power required, and co-efficient of performance; rating; testing; mechanical details. Refrigeration on temperature-entropy and heat-entropy diagrams. Absorption machines. The Platen-Munter system. Applications of refrigeration, including air-conditioning.

*Internal Combustion Engines :—*

Effect of variation of specific heat on efficiency. Entropy diagrams for gases applied to internal-combustion engine problems. Theory of gas-producers. Modern developments in internal-combustion engines.

The gas turbine : history and development; theory and calculations; mechanical details; applications.

Jet propulsion as applied to aircraft.

Rocket propulsion.

*Power Plant Management :—*

Comparison of different types of prime movers for various purposes in different circumstances, taking into account first cost, running costs, reliability, ease of control, maintenance cost, and depreciation.

Plant lay-out and general arrangement.

Efficient running and care of plant; maintenance of log books and records; running repairs and maintenance; periodic overhauls.

**B (IX) HEAT ENGINES (Sessional)**

The testing of steam turbines, including nozzle tests; different arrangements of nozzles and blading in the impulse turbine.

Analysis of steam engine indicator diagrams: detection of faults: adjustments: valve-setting. Similarly for internal-combustion engines: ignition timing.

The carrying out of comprehensive trials of thermal power plants, and of a refrigerator.

## B (X) APPLIED MECHANICS (Theory of Machines)

Effort, velocity, and acceleration diagrams : application to engines and machines. Inertia of reciprocating parts : crank effort diagrams. Turning moment diagrams. Inertia and kinetic energy of the connecting rod. Cyclical variation of speed : fly wheels. Theory of governors : various types, including spring loaded and shaft governors. Brakes and dynamometers. Belt, rope, and chain gearing. Toothed gearing : epicyclic trains. Hook's joint : Oldham's and other couplings.

Valves and valve Gears. Stephenson, Gooch, Allen, Hackworth, Marshall, Joy and Walschaert link motions. Poppet valve gears : oscillating and rotating cam types.

Balancing of rotating parts. Primary balancing of reciprocating parts. Balancing of locomotives. Secondary balancing. Balancing of in-line and radial multi-cylinder engines.

Gyroscopic action. Vibrations. The whirling of shafts. Lubrication and lubricants.

## B (XI) APPLIED MECHANICS (Hydraulics)

## B (XII) APPLIED MECHANICS (Sessional)

The Syllabuses for these subjects are as prescribed for the Civil Engineering Examination (Part II).

## B (XIII) WORKS ORGANISATION AND MANAGEMENT

Different forms of Organisation and Administration. Functions of Administration.

Organisation of Production. Fundamental policy—Single or multiple products—Quality and quantity standards, Capital requirements.

Main Divisions.—Technical, Commercial, Administrative, General structure of Works Personnel. Co-ordination of Functions and Departments.

Selection of Site. Factory layout—General arrangement of Works Power, Plant, Ventilation, Humidity, Equipment, Future extension, Sanitation, Water supply. Detail layout of departments.

Office routine.—Correspondence Office—Wages Office—Cost Office—Time Office—Clock Cards—General arrangement of entrance and exit of workers—Arrangement for payment of wages—Loyalty of Staff—Fitting the staff to their proper jobs.

Design and Development. Initial planning—Development of new designs—Industrial Designer—Competitive Products—Development by stages.

**Drawing Office.**—Sizes and numbers—Correct dimensioning with limits where necessary—Sketches—Customer's drawings—Tracings—Prints—Issue of drawings and prints—Amendments—Parts lists—Units and Limits—Standardization—Drawing Index—Estimating and Ratefixing—Estimator's data—Quotations—Allowance for inefficiency—Costing and estimating systems. Planning and Tooling—Material lists—Buying out *vs.* manufacturing inside—Indents for purchases—Tool design—Quality of tools—Planning of tools—Interchangeability of tools—Tool Room Programme—Jigs and Fixtures—Bought out tools—Tool Stores.

**Buying of materials.**—Enquiries—Index of suppliers—Classification of Purchases—Analysis of Purchases—Subcontracting—Contacting suppliers.

**Control of materials.**—Classification of materials—Stocks of materials—Requisitions—Consumable materials—Storage of materials—Warehousing—Bin Cards—Bin Checking.

**Goods received.**—Weighbridge—Checking. Goods inwards—Goods inward notes—Debit notes—Goods distribution—Contact with material control section.

**Control of Production.**—Fundamental requirements—Machine Loading Charts—Planning and Programming—Progressing—Progress Schedules—Production or Job Cards—Reject Tags—Rectification—Balancing Production—Scrap disposal—Floor inspectors—Inspection standards.

**Production efficiency.**—Job Cards—Analysis of lost time—Production chasers—Monthly or daily rate—Piece Work rates—Individual or group bonus—Point systems—Sales bonus—Profit sharing schemes. Labour expenditure—Analysis—Direct and indirect labour—Overtime—Fatigue—Shift work.

**Finished Components.**—Final Inspection and Packing—Delivery notes—Preferential rates—Transport.

**Labour.**—Federations and Unions—Works Committee—Welfare.

**Holidays.**—First Aid and Hospital facilities—Sick Funds.

**Insurance.**—Works Canteen—Games and Sports—Provident Funds, etc.

**Labour Troubles.**—General Treatment—Strikes and Lockouts.

**Supervisors.**—Qualifications and Selection—Fixing grades and Prospects—Advanced training.

**Recruitment and training of Superior Staff.**

**Training of Apprentices.**—Theoretical and Practical—General *vs.* Specialized training—Training records.

**Regulations affecting employees.**—Factory Act—Workmen's Compensation Act—Payment of Wages Act.

**Watch and Ward.**

**Maintenance.**—Plant—Machine—Depreciation—repairing *vs.* replacing.

Overheads.—Overhead expenses and charges—fixed and variable overheads—Works Salaries—Indirect labour.  
 Analysis and classification of Labour expenditure.  
 Stock Taking.—Stock Valuating.

## B (XIV) WORKSHOP THEORY

Fitting :—

Fitter's tools : different kinds of chisels, files, scrapers, hacksaws, drills, taps, dies. Marking-off tools. Fitting work.

Machine tools :—

Fundamental principles in the production of machined surfaces. Features of construction, function, and operation of different types of machines ; the lathe ; capstan and turret lathes ; automatic lathes ; reciprocating machines—including broaching ; drilling and boring machines ; milling machines ; grinding machines ; lapping machines ; honing machines. Surface finish and its relationship to accuracy and durability ; methods of testing surface finish.

Cutting tools : their profiles, materials, methods of manufacture, and heat treatment.

Speeds, feeds and cuts.

The planning of machine operations for particular jobs.

Machinability. Heat treatment of work. Case-hardening : nitriding.

Pattern-making and moulding :—

Principles, tools, general methods materials. Allowances. Relation with moulding. Pattern joints : loose pieces. Coring : core prints : core boxes.

Moulding : general principles. Moulding sands for different purposes : sand preparation : testing. Ramming ; venting. Gates, runners and risers. Moulding methods : equipment. Green sand and dry sand moulding. Loam moulding. Moulding machines. Mass production and mechanised methods. Chill-casting. Die casting. The cupola ; melting ; pouring. Grades of cast iron : testing. Non-ferrous moulding.

Forging :—

Equipment ; materials : methods. Effect of forging methods on physical properties and structure. Flow of metal. Correct and incorrect fibre direction. Annealing and normalising.

Rolling. Extruding. Sheet metal work.

Welding :—

Forge welding ; water gas welding ; fusion and thermit welding ; electric arc and resistance welding ; oxy-acetylene welding ; atomic hydrogen welding.



## B (XV) DRAWING AND DESIGN

The design of engine, boiler, and machine parts and assembly units, with reference to economical manufacture as well as to strength of the parts.

## B (XVI) ELECTIVE

### B (a) PRODUCTION ENGINEERING

Different kinds of production : job work ; quantity production to order ; mass production to stock : corresponding staff, equipment and methods required. Relation between design and production.

Production planning : job analysis : operation sheets : motion study : time study : rate-fixing.

Production-estimating and costing.

Methods of payment of wages. Payment by results.

Progress organisation in different circumstances. Methods of ensuring that men and machines are fully occupied. Job cards. Progress sheets, charts, and control boards. Procedure in special circumstances, such as breakdown of machines, rejection of parts.

Tool design, manufacture and storage.

Jig, fixture and gauge design, and methods of manufacture.

Material control. Stores organisation : necessary books and forms.

Manufacture : detail organisation of departments and sections : co-ordination of departments.

The progress of an order, from its receipt to final completion.

### B (b) MACHINE TOOLS

Fundamental principles in the production of machined surfaces. Features of construction, function, and operation of different types of machines. The lathe capstan and turret lathes ; automatic lathes. Reciprocating machines. Broaching. Drilling machines. Milling machines. Gear cutting machines. Grinding and grinding machines. Lapping and lapping machines. Honing machines. Surface finish, and its relationship to accuracy and durability : methods of testing surface finish.

Cutting tools : their profiles, materials, methods of manufacture, and heat treatment. Speeds, feeds, and cuts.

The planning of machine operations for the production of particular jobs. Production estimating. Selection of quickest and cheapest operations.

Considerations affecting the design of various machine tools with reference to their purpose; strength, rigidity, absence of vibration, accuracy.

Methods of checking the accuracy of construction and alignment of the various parts of machine tools.

### B (c) AUTOMOBILE ENGINEERING

Fundamental principles of the internal combustion engine. The development of the high-speed multi-cylinder petrol engine: modern types. Mechanical details: cylinders, pistons, connecting rods, crankshafts, bearings, crank-case, cooling systems, valves and valve mechanisms, cylinder heads and combustion chambers. Carburation, carburettors, and induction systems. Supercharging. Ignition systems: magnets, battery and coil. Valve and ignition timing. Exhaust systems: silencers. Lubrication.

The development of the high-speed multi-cylinder oil engine. Mechanical details: injection systems; combustion chambers.

Lighting and starting systems: batteries

Transmission: different arrangements of drive and positions of the engine. Clutches: fluid transmission. Gearboxes; different types. Universal joints and propeller shafts. Back axle and differential gear: details of transmission to wheels. Front axle: steering gear: independent suspension: front wheel drive. Spring and shock-absorbers. Chassis-frames: integral construction. Brake systems. Chassis lubrication. Tyres and tubes. Bodywork.

Care and maintenance of the various units. Fault-finding.

Overhaul: light and heavy repairs of the different assembly units.

Elements of automobile design.

### B (d) REFRIGERATION AND AIR CONDITIONING

#### (i) *Refrigeration* :—

Physical properties of low temperature insulants; heat transfer through typical walls of cold storage plants, refrigerator cars, and refrigerator ships; moisture and temperature conditions necessary for the preservation of the important foods; the microbiology of foodstuffs, the nature of their ripening and spoilage, the impurities of the atmosphere. Low temperature refrigeration. A study of the operations of the various types of compressors, evaporators, condensers, and automatic control used in commercial refrigeration systems. Heat flow problems in condensers and evaporators. Theory and calculation of size of cooling towers. The application of refrigeration in the manufacture of water ice, and dry ice.

Storage and transportation of foodstuff.

A study of the thermal, physical, and toxic properties of the chief refrigerants. A discussion of the time required to freeze ice. Application of refrigeration to skating rinks, shaft sinking, petroleum, breweries, and the manufacture of ice-cream.

(ii) Air Conditioning :—

Study of ventilation and the fundamentals of air conditioning. A study of the psychometric and comfort data with application to air conditioning problems. Applications of typical air conditioning equipment to various types of problems.

Requirements in different circumstances : dwelling houses ; offices ; factories ; trains ; ships ; aircraft. Structural requirements : specially designed buildings : modifications to existing buildings.

## B (XVII) PROJECT AND THESIS (Sessional)

Designs, working drawings and estimates for a complete set of machinery such as :—a steam engine ; an internal-combustion engine ; a turbine ; a pump, an air compressor ; a lathe ; a refrigerating machine.

## (C) ELECTRICAL ENGINEERING

### C (I) ECONOMICS AND ACCOUNTS

#### C (II) APPLIED MECHANICS (Strength of Materials)

The syllabuses for these subjects are as prescribed for the Civil Engineering Examination (Part II).

#### C (III) HEAT ENGINES II

The syllabus for this subject is as prescribed for the Mechanical Engineering Examination (Part II).

#### C (IV) HEAT ENGINES II (Sessional)

Continuation of Heat Engines I (Sessional). More comprehensive testing of internal-combustion engine and steam power plants.

### C (V) MATHEMATICS

1. Differential Equations of Electrical Engineering Problems. Use of complex variables.

2. Vector Analysis as applied to Electrical Engineering Problems.

3. Fourier Series and Harmonic Analysis. Analysis of E. M. F. and current waves—Application of Fourier Series to Engineering Problems. R. M. S. value of a periodic function.

4. Flow of Electricity in cables. Telephone Equation, Telegraph Equation, Radio Equation, Attenuation Constant.

5. Mathematical Theory of Electricity and Magnetism. Electrostatic field of force—Theorems of Gauss and Maxwell—Lines and Tubes of Force. Laplace's and Poisson's Equations. Distribution of charge on Spheres and Cylinders, capacity of Condensers. Differential Equations of Induction. Production of Eddy Currents. Electromagnetic Waves.

6. Operational calculus and its application to Electric circuits.

## C (VI) ADVANCED ELECTRO-TECHNOLOGY

D. C. machines.—Armature windings—Simple, complex, lap and wave windings, equalising rings, Cross magnetising and demagnetising action of armature re-action ; effects of commutation, reactance voltage ; compensation of armature re-action and commutation—brush shifting, use of interpoles and compensating windings. Detailed study and comparison of load characteristics of D. C. motors and generators ; losses and efficiency of D. C. machines. Starting and speed control of motors—construction and design of starters ; different methods of speed regulation and their relative merits. Separation of losses in D. C. machines. Comparison of two-wire and three-wire D. C. systems—use of static and rotating balancer. General principles of illumination.

Alternating current.—Complex circuits—mathematical and symbolic methods of solving circuit problems. Comparison of single and polyphase systems. Measurement of power of singlephase and polyphase circuits—three voltmeter, three ammeter and two wattmeter methods. Balanced and unbalanced polyphase circuits. Production of rotating magnetic fields, induction of rotational and pulsational E. M. F's. Alternators—E. M. F. equation, breadth co-efficient, different types of windings, construction of poles and their effects on performance, determination of efficiency and regulation, main principles of parallel operation. Transformers—Primary and secondary turns, E. M. S., current and ampere-turns ; Equivalent resistance, reactance and impedance ; construction of magnetic and copper-parts, methods of cooling ; ordinary, auto and scott transformers ; determination of efficiency and regulations—Open-circuit and short-circuit tests. Induction motors—Squirrel cage and slip-ring type, behaviour of motor at rest and under running conditions ; open and short-circuit tests—circle diagram and slip-torque diagram. Starting of induction motors—Auto-

transformer, star-delta and rotor resistance methods. Synchronous motors—working under load and no-load conditions, methods of starting, power factor improvement. General principles of working of rotary converters, motor converters, rectifiers and commutator motors.

### C (VII) ELECTRICAL MACHINES (Paper)

Systems of supply.—High and low tension generation ; D. C. and A. C. Single or polyphase—3 or 4 wire systems. Selection of sites for central stations—availability of water, fuel, transport and labour. Design and construction of Power House buildings. Determination of load and its economic division. Comparative study of water turbine and steam turbine drivers ; use of steam engines, steam turbines, crude-oil engines, and diesel engines. D. C. and A. C. generating units. Voltage regulation, parallel operation, synchronising of alternators. Use of transformers for step-up and step-down voltages and for parallel operation. Conversion plants—Rotary converters, motor converters and mercury arc rectifiers. Indoor and out-door sub-stations. Design and construction of switch-boards for central stations and sub-stations. Battery sets—installation and maintenance.

### C (VIII) ELECTRICAL MACHINES (Sessional)

More detailed study of Induction motors, alternators, synchronous motors, rotary converters, traction motors, commutator motors and mercury arc rectifiers. High-tension testing—Insulation tests, breakdown and minute values ; flash-over tests on insulators ; dielectric loss measurements.

### C (IX) SWITCHGEARS AND INSTRUMENTS

Detailed study of measuring instruments for D. C. and A. C. circuits—theory, construction, and application for different installations. Connection of ammeters, voltmeters, energy-meters on the different panels of power-stations and sub-stations. Instrument transformers, Power-factor meters, frequency meters, synchrosopes etc., for A. C. switchboards. Precision measurement—A. C. bridges and potentiometers. Use of oscillographs and ondographs. Knife-switches, air-break and oil-immersed circuit breakers ; maximum, minimum and reverse current relays for D. C. and A. C. systems. Design and construction of air and oil circuit breakers. Grouping of switch-gear etc., together with use of reactance coils. Calculation of K. V. A. rupturing capacity of circuit breakers required for typical networks. Protective devices for generating plants and transmission lines. Remote control gears and automatic devices.

## C (X) SWITCHGEARS AND INSTRUMENTS (Sessional)

The use and care of the standardising instruments. Measurement of alternating current power and method of determining phase difference. Precision measurements: A. C. potentiometers. Testing of electrical instruments to be used for power plants. Instrument design. Testing of different types of switchgear and protective devices. Use of oscillographs—Study of wave forms, and harmonic analysis.

## C (XI) APPLIED MECHANICS (Hydraulics)

## C (XII) APPLIED MECHANICS (Sessional)

The Syllabuses for these subjects are as prescribed for the Civil Engineering Examination (Part II).

## C (XIII) WORKS ORGANISATION AND MANAGEMENT

The syllabus for this subject is as prescribed for the Mechanical Engineering Examination (Part II).

## C (XIV) TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER

Systems of transmission and distribution.—D. C. two-wire and three-wire systems; A. C.—Single-phase and poly-phase systems; voltage regulation and transmission efficiency. Mechanical and electrical considerations of underground and overhead high voltage lines. Disturbances and protective devices; power factor correction.

Advanced dielectric theory in high voltage technics. High voltage cables. Self and mutual capacity co-efficients and reduction co-efficients of overhead transmission circuits. Interaction of feeders. Effect of ground wire. Interference on telephone and other lines. Voltage regulation of long lines. Sag and tension on inclines. High Voltage insulators for transmission circuits. Travelling waves and pulses. Reflection at transition points.

## C (XV) PLANNING AND DESIGN OF POWER SYSTEMS

Electrical survey of area for electrification. Load survey including possibilities of expansion both residential and industrial. Location of power station and sub-stations. Design and calculation of the number, capacity, type and voltage of the generating units and converting plants, necessary switch-board panels, switchgears, feeder cables and protective gears.

Design and calculation of transmission and distribution lines—overhead wires or underground cables. Design and calculation of the Electrical machines required for the scheme.

## C (XVI) ELECTIVE

### C (a) ELECTRICAL COMMUNICATION

(i) Line telegraphy.—Simplex and multiplex systems—Duplex and Quadruplex telegraphy—Differential and Bridge Duplex. Morse system—Sounder and inker. Telegraphic circuits—Open and closed circuits; single and double current working; polarised and non-polarised relays; direct and indirect working. Automatic telegraphy—Wheatstone's apparatus and Bain's system; Hughes's type printing system. Baudot multiple system.

(ii) Line telephony.—Manual and automatic telephony—transmitters and receivers; different types of manual exchanges—magneto and central battery systems. Subscriber's sets, line circuits, cord circuits and switchboard appliances at exchanges. Automatic exchanges. Protection of telephone lines from electric disturbances and inductive interference. Maintenance of exchanges.

(iii) Wireless communication.—Laws of oscillating circuits; high frequency oscillations; electro-magnetic waves and their application in wireless communication; spark telegraphy and continuous wave telegraphy; thermionic valves and their applications; radio-telephony and broadcasting long and short wave transmission; transmitters and receivers for telephony; broadcasting stations and receiving sets; construction of transmitter and receiver sets.

### C (b) ELECTRIC TRACTION

Mechanics of train movement. Study of speed-time curves and energy consumption; D. C. traction motors; single-phase and poly-phase traction motors; control of D. C. tramway and railway motors; control of A. C. single phase and polyphase motors, regenerative braking; track construction for tramways and railways; overhead construction for tramways and railways; feeding and distributing systems for tramways and railways; sub-stations, including conversion plants for tramways and railways.

### C (c) ILLUMINATION ENGINEERING

Quantities, units and relations employed in illumination such as lumen, candle-power, foot-candle, etc. Theory and

use of typical measuring devices—precision and standard photometers, integrating spheres, reflectometers, calculation of illumination from point, line and surface sources of light exhibiting typical space distribution of light ; light-flux output of symmetrical distribution source ; calculations regarding light in an enclosure, utilization co-efficient, point by point and flux-of-light method of illuminating interiors. Laws of vision affecting lighting ; characteristics of lamps, reflectors ; glare and shadow. Industrial, office, school and residence lighting. Selection and application of equipment, design of circuits, study of methods of installation for power supply to lamps. Design and performance of lamps, reflectors, refractors, diffusers and other controlling devices for economic illumination consistent with visual effectiveness. Special illumination such as flood-lighting, window display, neon lighting for cinemas and publicity posters, etc.

## C (XVII) PROJECT AND THESIS (Sessional)

This will consist of an actual project of electrification including power stations, sub-stations, switchboards, overhead and underground lines, etc., also designs and calculations for one A. C. machine and one D. C. machine with complete working drawings.

## (D) METALLURGICAL ENGINEERING

### D (I) ECONOMICS AND ACCOUNTS

The Syllabus for this subject is as prescribed for the Civil Engineering Examination (Part II).

### D (II) REFRACTORIES, FURNACES, AND FUELS (Paper)

Refractory materials :—

Acid, basic and neutral refractories. Physico-chemical properties that enable them to resist erosion, high temperature, changes of temperature and action of molten metal and slag. Study of expansion, contraction, specific heat, porosity, permeability, thermal and electric conductivity of refractories. The preparation of refractory materials and their uses in the manufactures of fire-bricks, crucibles, retorts and for lining furnaces.

Furnaces :—

Classification of furnaces. Design, construction, operation and application of different types of metallurgical and industrial furnaces.



**Fuels :—**

The chemical composition, calorific power and general uses of fuels. Combustion, calculation of volumes and weights of air necessary for combustion of fuels. Calculation of heat loss. Conditions necessary to ensure heat efficiency of furnaces.

**Solid fuels :—**

Wood and charcoal. Coal, its origin, nature and classification. Characteristics and distribution of Indian coals. Destructive distillation of coal at high and low temperatures. Manufacture of Metallurgical coke and recovery of by-products. Pulverised coal and coal briquettes.

**Liquid fuels :—**

Petroleum and their distillation products. Coal tars and their distillation products. Shale oil. Products of hydrogenation of coal.

**Gaseous fuels :—**

Producer gas, semi-producer gas, water gas, Mond gas, blast furnace gas. Their manufacture, composition and calorific values. The chemical reaction and thermal changes involved in gas production.

**Calorimetry :—**

Types of calorimeters for estimating the calorific values of solid, liquid, and gaseous fuels. The bomb calorimeter.

**D (III) REFRACTORIES, FURNACES, AND FUELS**

(Sessional)

The course includes testing of fuels, flue, gases and refractories and making sketches of different types of kilns, ovens and furnaces.

**D (IV) INORGANIC AND PHYSICAL CHEMISTRY (Paper)****Inorganic Chemistry :—**

Preparation and systematic study of the following elements and their technically important compounds with special reference to their application in metallurgy : Hydrogen, Lithium, Sodium, Potassium, Beryllium, Magnesium, Calcium, Strontium, Barium, Radium, Boron, Aluminium, Zinc, Cadmium, Mercury, Copper, Silver, Gold, Carbon, Silicon, Tin, Lead, Nitrogen, Phosphorus, Oxygen, Sulphur, Chlorine, Bromine, Iodine, Arsenic, Antimony, Bismuth, Iron, Nickel, Cobalt, Selenium, Tellurium, Chromium, Helium, Neon, Argon, Krypton, Xenon, Niton, Titanium, Vanadium, Manganese, Molybdenum, Ruthenium, Rhodium, Palladium, Platinum, Cerium, Thorium, Tantalum, Tungsten, Osmium, Iridium, Uranium.

Elements of crystal structure, Artificial Radio-activity, Werner's Co-ordination theory and the Ammines, Persulphates, Percarbonates, Perchromates, Hydrides, Carbides, Nitrides, Carbonyls, Hydrozine, Hydroxylamine, Fixation of Nitrogen, Corrosion of metals and alloys and its prevention.

Physical Chemistry :—

Properties of gases and liquids; Avogadro's hypothesis; Kinetic theory; Properties and laws of solution; Law of mass action; Chemical equilibrium in homogeneous system; The Phase rule; Equilibrium in heterogeneous system; Colloids; Velocity of reaction; Catalysis; Theory of electrolytic dissociation and its application; Law of conservation of energy; Thermo-chemistry: Second law of thermodynamics and its application to chemical reactions: Clausius—Clapeyron equation: Joule-Thomson effect: Relation between chemical and electrical energy; origin of E. M. F. in primary, secondary and concentration cells; Theory of electrolytic corrosion: principles of electro-analysis and electrometric titration; Thermodynamical study of technical gas reactions.

## D (V) INORGANIC AND PHYSICAL CHEMISTRY

(Sessional and Practical)

Inorganic Chemistry :—

Estimation of Iron, Copper, Lead, Tin, Zinc, Nickel, Manganese, Chromium, Antimony, Silver, Magnesium, Chloride, Sulphate and Phosphate by wet method.

Separation and estimation of a mixture containing :—

Iron and Aluminium, Iron and Manganese, Calcium and Magnesium, Copper and Zinc, Copper and Nickel, Iron and Nickel.

Detection of metals present in Alloys, Ores, Fluxes and Slags both by ordinary and micro methods.

Physical Chemistry :—

Molecular weight determination by Victor Meyer's vapour density method; Molecular weight determination by freezing point method; Distribution of a solute between two non-miscible solvents; Investigation of homogeneous equilibrium—Hydrolysis of methyl acetate; Conductivity of electrolytes—Determination of cell constants; Preparation of standard half elements and determination of decomposition potential of salts; Electro-metric titrations by oxidation-reduction methods; Electro-metric titrations by precipitation method; determination of hydrogen in concentration and acid alkali titration; calorimetry and the use of bomb calorimeter; Determination of transition temperature of salts and alloys by dilatometer.

## D (VI) GEOLOGY, MINERALOGY, AND DRESSING OF MINERALS (Paper)

**Physical Geology.**—A general view of the earth. Denudation by the weather, rivers, glaciers and the sea; transportation and deposition of detritus; consolidation of detritus. Lamination, stratification. Volcanoes and volcanic products. Mode of occurrence of igneous rocks: dyke, sill, neck, laccolith, phacolith, stock, batholith. Results of earth movements: formation of basins, domes, folding, over-folding: dip, strike, out-crop; normal and reversed faults. Rock cleavage, joints, metamorphism; thermal, dynamic and regional metamorphism.

**Petrology.**—Classification, character and essential constituents of the more important igneous rocks. Sedimentary rocks—characteristics: Mode of origin and classification: General description of different sedimentary rocks.

**Metamorphic rocks.**—Characteristic structures. General description of commoner kinds of metamorphic rocks.

**Palaeontology.**—Fossils, their mode of preservation: rocks in which they occur. Importance of fossils in stratigraphical geology.

**Stratigraphical Geology.**—Leading principles of stratigraphy. A general outline of Indian stratigraphy.

**Crystallography.**—Symmetry: Crystallographic arcs. Indices: Systems and Forms; Reading and drawing of crystals.

**Mineralogy.**—Physical properties of minerals in general.

Description of the following mineral species:—

Native elements—Diamond, Graphite, Gold.

Ore Minerals—

Aluminium—Bauxite.

Antimony—Stibnite.

Chromium—Chromite.

Copper—Chalcopyrite, Bornite, Chalcocite, Cuprite, Malachite, Azurite.

Iron—Magnetite, Hematite, Limonite, Siderite.

Lead—Galena, Cerussite.

Magnesium—Magnesite.

Manganese—Psilomelane, Braunite, Pyrolusite.

Mercury—Cinnabar.

Nickel—Pentlandite, Garnierite, Nicotite, Nickeliferous Pyrrhotite.

Silver—Argentite, Pyrargyrite, Proustite.

Sulphur—Pyrites.

Tin—Cassiterite.

Tungsten—Wolframite, Scheelite.

Zinc—Sphalerite, Smithsonite.

Refractory Minerals—Quartz, Kaolinite, Magnesite, Chromite, Graphite, Bauxite, Silimanite, Kyanite.

Oxide—Quartz, Corundum.

Carbonates—Calcite, Dolomite, Magnesite.

Sulphates—Gypsum, Barytes.

Phosphates—Apatite.

Silicates—Feldspar group, Feldspathoid group, Pyroxene group, Amphibole group, Olivine, Muscovite, Biotite, Talc, Serpentine.

Halides—Fluorite, Cryolite.

Economic Geology—Form of mineral deposits. Origin and classification of mineral deposits: Enrichment of ore deposits: Coal, Petroleum, clay and economic mineral deposits in India.

### Dressing of Minerals

Purpose and advantage of separating gangue material from valuable minerals and one mineral from another. Properties made use of in separation. Concentration by hand picking and sorting. Breaking, crushing and grinding mills. Sizing, classification. Water connection. Floatation concentration. Magnetic, electrostatic, pneumatic and centrifugal separation. Percentage recovery, ratio of concentration and enrichment. Flow-sheets.

## D (VII) GEOLOGY, MINERALOGY, AND DRESSING OF MINERALS (Sessional)

Determination of physical properties of minerals. Identification in the laboratory of minerals studied during lectures. Demonstration of methods of ore microscopy and preparation of polished sections of ore minerals. Megascopic determination of rocks. Separation of one ore mineral from another by means of laboratory size ore dressing equipments. Making sketches of ore dressing plants.

## D (VIII) ELECTRICAL ENGINEERING

D. C.—Armature windings of D. C. machines. Detailed study of characteristics of generators and motors. Parallel running of generators and motors. Speed control of motors. Testing of D. C. machines. Balancers.

A. C.—Comparison of single-phase and poly-phase systems; measurement of power of poly-phase systems; mathematical and symbolic method of solving A. C. circuits problems; balanced and unbalanced circuits.

Detailed study of alternators and transformers—E. M. F. equation; windings; determination of regulation and efficiency. Rotating magnetic field. Induction motors—squirrel cage and

slip-ring types ; methods of starting. Main principles of working of synchronous motors and converters and mercury arc rectifiers.

Electric Furnaces—Furnaces for ferrous and non-ferrous metals. Different types of furnaces—Resistance furnaces ; Arc Furnaces ; Induction-furnaces—Low and High frequency types. Use of transformers of various types for furnaces. Furnace conductors and connections. Resistors and Electrodes for electric furnaces. Principles of design of electric furnaces.

## D (IX) METALLURGY OF IRON AND STEEL

Occurrence and distribution of iron ores. Iron ores of India. Preparation of iron ores. The blast furnace and its accessories. Smelting of iron ore in the blast furnace. Chemistry of smelting ; calculation of blast furnace charge. The advantage and necessity of preheating air blast. The evil effect of too much moisture in blast. Effect of furnace charges and conditions of working on the composition of pig iron. Blast furnace products. Composition and grading of pig iron. Influence of different constituents on the properties of pig iron. Manufacture of sponge iron. Manufacture of spiegeleisen, ferro-manganese and ferro-silicon in the blast furnace. Foundry cupola, chilled and malleable castings. Methods of manufacture, properties and uses of wrought iron.

Production of tool steels by cementation and crucible processes. Grading of tool steel. Manufacture of steel by Bessemer, open-hearth, modified open-hearth, duplex and electric processes. Chemistry (including thermo-chemistry) of the processes of steel making. Comparative study of the various steel-making processes. Considerations to be taken into account in the selection of a process. Manufacture of iron and steel in ancient India. Methods of making alloy steels. The study of foundry and steel castings. Influence of carbon and other elements on iron. Case-hardening of steel. Welding. Corrosion and methods of protecting iron from corrosion, including galvanizing, tinning, etc.

(*N.B.*—In the treatment of subject the methods that are in operation in India will be dealt with more fully.)

## D (X) METALLURGY OF NON-FERROUS METALS

Gold—The ores of Gold. Preliminary treatment and processes of extraction. Parting of gold and silver. Refining Alloys of gold. Standard gold.

Silver—The ores of silver. Preliminary treatment and extraction. Cupellation. Refining. Alloys of silver. Standard silver.

**Copper**—The ores of copper. Smelting in reverberatory and blast furnaces. Pyritic smelting. Calculation of furnace charge. Constitution of copper matte. Bessemerizing of copper matte in different types of converters. Wet method of extraction. Furnace and electrolytic refining of copper. Chief alloys of copper.

**Nickel**—The ores of nickel. Methods of extraction and refining. Grain, cast and malleable nickel. Chief alloys and nickel.

**Lead**—The ores of lead and their smelting. Softening of hard lead. The Pattinson and Parkes processes of desilverisation of lead. The chief alloys of lead.

**Tin**—Dressing and separation of tin ores from wolfram, etc. The smelting of tin ores and refining of tin. Treatment of the rich slag. The alloys of tin.

**Zinc**—The ores. Extraction and refining of zinc. Chief alloys of zinc.

**Antimony**—Softening of antimony ores and refining of the metal. Alloy of antimony. Elementary treatment of the metallurgy of Cadmium, Mercury, Manganese, Chromium, Beryllium, Tungsten and Platinum.

The chief physical, mechanical and chemical properties as well as the uses of the above metals.

Methods of recovering non-ferrous metals from alloys and scrap as secondary metal. Powder metallurgy.

(*N.B.*—In the lectures on this subject the methods that are in operation in India will be treated more fully.)

## D (XI) ASSAYING AND METALLURGICAL ANALYSIS

(Paper)

The necessity and importance of securing a representative sample for analysis. Conditions on which this depends. Hand sampling and mechanical sampling. Common methods of sampling coal, ores, metals, etc.

Lectures will be given to explain the principles underlying the analyses and assays prescribed for the Practical Course.

## D (XII) ASSAYING AND METALLURGICAL ANALYSIS

(Sessional and Practical)

The fire assay of the ores of gold, silver, lead and tin, and gold and silver bullion. Making of common non-ferrous alloys in a crucible furnace in the laboratory, and their analysis. The complete analysis of refractories in the ferrous and non-ferrous alloys, ores, mattes, slags and other metallurgical products.

### D (XIII) WORKS ORGANISATION AND MANAGEMENT

The syllabus for this subject is as prescribed for the Mechanical Engineering Examination (Part II).

### D (XIV) ELECTRO-METALLURGY AND MECHANICAL WORKING AND TESTING OF METALS (Paper)

#### (a) Electro-metallurgy :—

Theoretical principles underlying electro chemistry.

Extraction on refining of the following metals by electrolytic methods :—

Sodium, Potassium, Calcium, Magnesium, Aluminium, Copper, Zinc, Iron, Nickel, Lead, Gold and Silver. Principles of electroplating. The electro-thermal process of reducing iron from its ores. Various types of electric furnaces used in metal industry. Processes of making steel, alloy steel and ferrous alloys in electric furnaces. Electrodes, economizers, electrical connections and control. Electric welding.

#### (b) Mechanical working and testing of metals—

Defects of cast metal. The need for mechanical working. The flow of metals. Effect of composition and impurities. Cold and hot working. Cold and red shortness. Temperature of working.

Various methods of working metals, *viz.*, rolling, forging by hammer and press, drop-forging, stamping, extrusion, etc. Mechanical properties of metals and how they are tested.

Typical standard specification of important industrial metals and alloys.

Inspection of defects and flaws in metals.

### D (XV) MECHANICAL WORKING AND TESTING OF METALS (Sessional)

Procurement and preparation of test pieces. Calibration of tensile testing machine. Use of Extensometer. Carrying out of tensile, compressive, hardness, impact, torsion, shear and fatigue tests. Study of different types of fracture and their significance. Correlation between test results and changes of structure due to heat and mechanical treatment as well as orientation of grains.

### D (XVI) METALLOGRAPHY, HEAT TREATMENT AND PYROMETRY (Paper)

Introduction.—Crystal-structure and Micro-structure of metals. Relationship between composition, constitution struc-

ture, and properties. Crystallisation and melting of metals and alloys. Heating and cooling curves. Thermal equilibria in Metallic systems, under-cooling, Systematic study of the various types of equilibrium diagrams. The phase rule and its application to metallic system.

The grinding, polishing and etching of Metallic sections. The optics of Metallographic Microscope. Importance of both thermal and microscopic methods in the study of the constitutional and structural changes of metals and alloys. Dilatometric and other methods.

Crystallisation of pure metals, solid solutions, eutectics, eutectoids and compounds from liquid and solid solutions and characteristics of their micro-structure. Effect of rate of cooling; inhomogeneity; diffusion.

Detailed study of iron-carbon equilibrium diagram. Modification of the diagram on the addition of Mn, Ni, Cr, etc. Structure of wrought iron, steel, cast iron and alloy steels.

Equilibria in the more industrially important non-ferrous systems such as Copper-Zinc, Copper-Tin, Copper-Silver, Copper-Aluminium, Aluminium-Silicon, Aluminium-Magnesium, Lead-Antimony, Lead-Tin, Tin-Antimony, etc. Effect of heat treatment on transformation and structures. Hardening of steel and structures of hardened steel. Effect of rate of cooling on structure. Characteristics of transformation at constant temperature.

Precipitation from solid solution: Age-hardening; Quench-aging; Strain-aging, Temper brittleness; Plasticity of metals; Cold work; Annealing and recrystallisation. Heat treatment of Duralumin and other non-ferrous alloys. Pyrometry—Air thermometer, thermo-electric couples, the electric resistance thermometer, radiation and optical pyrometers, Seger cones, calibration of pyrometers. Determination of freezing and melting points and phase changes in the solid condition. Methods of plotting curves.

## **D (XVII) METALLOGRAPHY, HEAT TREATMENT AND PYROMETRY (Sessional and Practical)**

Standardization of pyrometers. The thermo-electric methods of determination of freezing point-curves, and critical points in the solid state by means of potentiometer. Types of industrial pyrometers and their use. Microscopic examination of metallic sections. The preparation of micro-sections. The use of the microscope in the examination of metals and alloys. Systematic examination of the micro-structures of metals including pure metals, wrought iron, steels, alloy steel, cast iron, brasses, bronzes, antifricition metal, zinc-aluminium alloys and other important industrial alloys. Photomicrography.



The effect of rate of cooling, normalizing, annealing, quenching, tempering, and presence of inclusion on the micro-structure and mechanical properties of metals and alloys.

## D (XVIII) ELECTIVE

### D (a) Advanced Metallurgy of Alloy Steel

Manufacture, production and uses of ferro-silicon, ferro-manganese, ferro-chromium, ferro-tungsten, ferro-molybdenum, ferro-vanadium, ferro-phosphorus, ferro-titanium and alloy cast iron.

Manufacture and composition of alloy steel containing :—  
 (1) Single alloying element such as nickel, chromium, molybdenum, tungsten, vanadium, silicon, manganese ; (2) Two alloying elements such as nickel-chromium, chromium-molybdenum, chromium-vanadium, silicon-manganese, nickel-molybdenum, nickel-vanadium, manganese-chromium, manganese-molybdenum, manganese-vanadium, and molybdenum-vanadium ; (3) Three alloying elements such as nickel-chromium-molybdenum, manganese-chromium-vanadium, manganese-chromium-molybdenum, and manganese-nickel-vanadium. (4) High tensile structural steel and (5) Special steels such as corrosion and heat resistant steels, stainless steels, high speed steels and other cutting materials, ferro-magnetic steels, alloy case-hardening and nitriding steels, cutting alloy steels.

Fabrication, heat treatment and metallography of the above steels.

### D (b) Advanced Metallurgy of Non-Ferrous Alloys

Detailed study of the chief non-ferrous alloys used in engineering, arts and industries including various kinds of brasses, bronzes, type metals, anti-friction metals and light alloys based on aluminium and magnesium. Production of castings and die-castings of non-ferrous metals. Different methods of working non-ferrous metals such as forging, stamping, rolling, drawing and extruding. Cold work and grain growth. Heat treatment of non-ferrous alloys with special reference to precipitation hardening alloys like duralumins. Surface treatment of aluminium and magnesium and alloys based on them. Physical and chemical methods for the production of metal powders. Pressing and annealing of metal powder and study of diffusion, recrystallization and grain growth due to these operations. Application of powder metallurgy. Metallography of the principal non-ferrous binary and ternary systems. Formation of inter-metallic compounds and order and disorder in non-ferrous alloys. Secondary metals.

### D (c) X-ray Crystallography and Spectroscopy of Metals and Alloys

#### (i) X-ray Crystallography—

Continuous and characteristic spectrum. Moseley's Law. Absorption of X-rays. Filtering. Scattered radiation. X-ray tubes for diffraction and radiographic purposes. Photographic efficiency of X-rays.

#### *The fundamentals of crystallography—*

The diffraction of X-rays by crystals : Bragg's Law ; Interplanar spacings ; Relation of atomic arrangement to Diffraction Pattern ; Relation of atomic arrangement to Diffracted Intensities ; The Structure factor equation. X-ray Diffraction methods ; The Laue method ; The rotating crystal method : The powder method.

#### *Examples of structure determination—*

The structure of metals and alloys : Structure of elements ; Solid solutions ; Intermediate Phases ; The structure of Liquid metals ; Superlattices, Plastic deformation of metals ; Structure of cold-worked metals. Preferred orientation resulting from cold work ; Preferred orientation after recrystallisation ; Orientation in castings ; Determination of flaws by X-rays.

#### (ii) Spectroscopy—

The fundamental principles of spectroscopy. The types and practical uses of prism spectrometers and spectrographs. Infra-red spectroscopy. Spectroscopy of the ultra violet. The vacuum grating spectrograph.

The practical analysis, both qualitative and quantitative, of representative metals, minerals and ores, etc.

This course will also include a few lectures on the application of the Electron Microscope to the study of metallographic problems.

*N.B.*—The lectures will be as far as practicable illustrated by practical demonstration in the classes and laboratories.

### D (XIX) PROJECT AND THESIS (Sessional)

The work will consist of either an investigation on a Metallurgical problem or a design, working drawings and estimate for a Metallurgical Plant or Machinery.

14. Candidates appearing in the Bachelor of Engineering Part II Examination may also be examined, if they so desire, in Applied Mathematics as an additional subject, carrying 100 marks. Such candidates, however, will receive credit only for the number of marks they obtain in this subject over and above 40 marks which are the pass marks.

15. The limits of the subject shall be as follows :—

### APPLIED MATHEMATICS

**Statics :—**Vectors. Various kinds of forces. Parallel forces and centres of gravity. Conditions of equilibrium of coplanar forces. Funicular polygon. Principle of virtual work. Stable and unstable equilibrium. Deflection in a framed structure. Catenary. Suspension bridge. Simple cases of forces in space. Engineering applications.

**Dynamics of a Particle :—**Rectilinear motion. Resisted rectilinear motion. Motion in two dimensions. Tangential and normal acceleration. Radial and transverse accelerations. Projectile. Resisted projectile. Simple harmonic motion. Forced and damped oscillations. Impulse and momentum. Work and energy. Motion in a vertical curve. Centrifugal forces. Conical pendulum. Cant on railway curves. Engineering applications.

**Dynamics of Rigid Bodies :—**D'Alembert's principle. Two-dimensional motion of a rigid body. Motion about a fixed axis. Compound pendulum. Principle of energy. Impulse and momentum in plane motion. Hoop stress and stress in the rim of a fly-wheel. Engineering applications.

**Hydrostatics :—**Fluid pressure. Resultant pressure, Centre of pressure. Equilibrium of floating bodies. Metacentre. Stability of floating bodies. Measurement of heights by Barometric pressure. Nature and action of simple hydraulic machines. Engineering applications.

Detailed syllabuses of studies in the subjects for the different branches of B.E. Part II Examination may be modified from time to time by the Syndicate on the recommendation of the Board of Studies in Engineering.

### TRANSITORY REGULATIONS

1. In this chapter, the phrase "New Regulations" shall be taken to mean the present body of regulations.

The phrases "Old Regulations" and "Old Rules" shall be taken to refer to the Regulations and Rules in operation on the date previous to that on which the New Regulations come into force.

2. (a) Candidates who have studied or are studying the Intermediate Engineering course according to the Old Regulations may be permitted to appear at the Intermediate Engineering Section A Examination which shall be held for them only in 1947 and at the Intermediate Engineering Section B Exami-

nation which shall be held for them only in 1947 and 1948 according to the Old Regulations.

(b) Similarly candidates who have studied or are studying Bachelor of Engineering courses according to the Old Regulations may be permitted to appear at the B.E. Part I Examination which shall be held for them only in 1947 and at the B.E. Part II Examination which shall be held for them only in 1947 and 1948 according to the Old Regulations.

3. Candidates who have studied or are studying the Bachelor of Metallurgy course according to the Old Regulations may be permitted to appear at the B.Met. Section B Examination which shall be held for them only in 1947 and at the B.Met. Final Examination which shall be held for them only in 1947 and 1948 according to the Old Regulations.

4. Notwithstanding the provision in Regulations 2 and 3 above, the Syndicate may in exceptional cases permit any candidate to appear at I.E., B.E. or B.Met. Examinations even after the year 1948.

5. Any candidate passing the I.E. Examination according to the Old Regulations in any year up to and including 1948 will be allowed to study the B.E. Part II courses in Civil, Mechanical, Electrical or Metallurgical Engineering according to the New Regulations.

6. Candidates who have been studying B.E. courses under the New Regulations during the 1945-46 session will be permitted to appear at special examinations to be held in the year 1946-47 for their benefit only in any or all of the subjects mentioned in Regulation 3 of the B.E. Part I Examination and in Regulation 4 of the B.E. Part II Examination of the New Regulations.

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## CHAPTER LII-A

### DIPLOMA IN TOWN AND REGIONAL PLANNING (D. T. R. P.)

1. An examination for the Diploma in Town and Regional Planning Examination will be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any graduate in Civil Engineering of the University may be admitted to the examination, provided he has prosecuted a regular prescribed course of study in a College of Engineering affiliated to the University for two academic sessions of eight months each after passing the Bachelor of Engineering Examination.

Any graduate in Architecture of the University or any person holding equivalent qualifications may also be admitted to the examination, provided he has prosecuted a regular prescribed course of study in a college of Engineering affiliated to the University for one academic session of eight months after passing the Bachelor of Architecture or equivalent examination.

3. Every candidate for the D.T.R.P. Examination shall be examined in subjects mentioned in Section 10 below.

4. In order to pass the D.T.R.P. Examination, a candidate must obtain forty per cent. of the full marks of each subject and half of the aggregate.

5. A candidate who fails to pass or to appear in the examination after completion of a regular course of study and passing the Test may appear at the next following examination for the Diploma as a regular student of the college. If he fails to pass or to appear at that examination he may be permitted to appear again at subsequent examinations as a non-collegiate student provided he is specially recommended by the Principal of his college.

6. Every candidate for admission to this examination shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate and a fee of Rs. 100 at least a month before the date fixed for the commencement of the examination.

A candidate who fails to pass or to present himself for the examination shall not be entitled to a refund of the Examination fee.

7. A candidate who fails in one subject only and by not more than five per cent. of the full marks, but has shown merit by gaining sixty per cent. or more in the aggregate marks of the examination shall be allowed to pass.

8. If the Board of Examiners are of the opinion that in the case of any candidate not covered by the preceding regulations, consideration ought to be allowed by reasons of his high proficiency in a particular subject or in the aggregate, they shall report the case to the Syndicate, and the Syndicate may pass such a candidate.

9. As soon as possible after the D.T.R.P. Examination the Syndicate shall publish a list in order of merit of those who have passed the D.T.R.P. Examination.

Every candidate on passing shall receive a Diploma prescribed in the form (Appendix A) and be entitled to use after his name the abbreviation D.T.R.P. (Cal.) to indicate that he has passed the examination.

A candidate who stands first shall receive a gold medal and a prize of books to the value of Rs. 200 provided he passes the examination at the first chance.

10. The subjects for the D.T.R.P. Examination and distribution of marks are as follows :—

(i)	(a)	History of Town Planning and Civic Design		
	(b)	Sociology, Philosophy and Economics in relation to Planning.	.. 100	marks
(ii)		Town Planning Law	.. 100	„
(iii)		Town Planning in relation to Engineering (for engineers) or Town Planning in relation to Architecture Town and Country planning in relation to amenities and Landscape planning (for Architects).	100	„
(iv)		Statutory Planning Practice (Theory)	.. 100	„
(v)		Town Planning Practice (Theory)	.. 100	„
		(Drawing)	.. 100	„
(vi)		Town and City Planning and Regional Planning.	.. 100	„
(vii)		Sessional Work—		
	(a)	Studio work	—	
	(b)	Planning Project and Thesis	—	
			.. 500	„
Total			.. 1200	marks

The Syndicate shall have power to add to or to modify from time to time the subjects for the examinations and the distribution of marks as also the limits of the different subjects as set out below :—

11 The limits of the subjects are as follows :—

(i) (a) (1) *History of Town Planning and Civic Design*—Planning through ages in India, Egypt, Assyria, China, Greece, Roman Empire, Mediaeval and Renaissance Periods, Industrial development—Planning in the new world and planning in recent times.

Planning in pre-Roman days—Roman planning—Principle Plans of some Roman towns.

Origin and character of Mediaeval towns—Plans of towns of that period.

Renaissance period—Changes resulted in town—Park and garden planning.

Industrial Revolution period—Its influence on development of towns and villages.

2. (1) *History of Town Planning*—Historical survey of planning—its value—methods and sources of study.

Evolution and method of growth of towns in different ages—Migration and trade routes—communication system and transport and town-plans—relation between them in all ages.

Character and individuality of town from strategic, industrial, Commercial, social or climatic point of view.

Effects of industry on town plans—Problems of housing—Overcrowding—slum clearance—preservation of country side.

Contribution to modern town planning in various countries.

*Civic Design*—Styles of architecture prevalent in India in different periods and in England from Roman period to the present days—their main characteristics—how these styles were related to garden, park and town planning—influence of sports and games in open space planning.

Planning of houses—housing estates—street-facades—shopping areas—industrial and commercial buildings—‘places’—different kind of streets in relation to architectural appearance.

(b) 1. 5. *Sociology, Philosophy and Economics in relation to Town Planning*—(It is suggested that the lectures on Sociology and Economics, given already in the earlier period of the Engineering course, shall be given as a refresher course).

Philosophy—individual and community—background of living—possibilities of individual and collective life, time and space.

Biological influence—influence of religion on planning—social concept of community—basis of urban and regional order—background of higher life for

(ii) 1. 4. and 2. 3. *Town Planning Law*—(In order that this degree will be recognised by the Town Planning Institute, London, English Planning Law is incorporated).

Some important Town Planning—Road, Housing and Public Health Acts in India. Government and Public Administration in India.

Government in England—local Government areas—local authorities—their powers, etc.

Town and Country Planning Acts—1932, 1943, 1944, 1947. Regulations and circulars.

Acquisition of land—arbitration—compensation and Betterment Acts—new streets—building and improvement lines.

Highway Acts—Trunk Road Act—Road Improvement Acts—Public Health Acts—Housing Acts for slum clearance and re-development, etc., New Towns Act.

Town Planning—legal disputes and how they are dealt with.

(iii) 1. 6. and 2. 6. *Town Planning in relation to Engineering* (for Engineers)—(a) Highway Engineering; (b) Water-supply; (c) Sewerage and Sewage disposal; (d) Refuge disposal; (e) Street-lighting; (f) Planning in relation to environmental hygiene; (g) Law of Property Act—definitions and their explanations—valuation and rentals—examples and actual valuations of different types of buildings—free-holds and lease-holds.

Street-lighting will include lumen, candle power and foot-candle—characteristics of lamps—reflectors—glare and shadows—lighting of different types of streets—spacing of lamps and other details. Special illumination—flood-lighting—window display—neon-lighting for cinemas and publicity posters and their effects on road. Road surfaces—different types and their effect in wet and dry conditions and under street-lighting and special lighting.

2. 4. *Town and Country Planning in relation to Architecture and Amenities and Landscape Planning* (for Architects)—Appropriate treatment of architecture in town and country—criticisms of plans of important Indian, American, English, French, Italian and other continental cities from architectural point of view.

Criticism of 'places'—streets in different cities.

Planning of rural communities and villages in relation to surroundings.

General consideration of amenities—national parks—ancient monuments, etc.

Garden planning—history of garden planning in different countries—formal and informal types—rock-gardens—elements of gardens and rock-gardens—garden accessories.

Landscape planning—principles of park and landscape design—treatment of different types of landscape.

Trees—different types and their suitability for different areas—qualities of trees—tree-planting—knowledge of shrubs and flowers.

(iv) 2. 2. *Statutory Planning Practice*—(This subject is introduced in order that this degree may be recognised by the Town Planning Institute, London).

Statutory planning practice in England—history of statutory planning up to now—Barlow, Scott and Uthwatt Reports—Hob-house Report and National Parks—Reith Committee Report and New Towns—Ministry of Town and Country Planning Regulations—Estate Management.

(v) 1. 2. *Town Planning Practice*—Elements of design—esthetic qualities of materials—proportion—space—scale—plans on paper and practice—treatment of sites—mass and volume—



accommodation—horizontal and vertical treatment—courts—arcades—‘places’.

Principles on which number of parts or objects, colours can be grouped to a harmonious whole—values of utility and beauty thus created.

Planning for unity—simplicity of plan—style—axial-planning—vistas—emphasis and subordination—ordered approach—surprise—symmetrical and asymmetrical planning—rhythm and repetition—repose and monotony—interest and restlessness—climax and anti-climax—principles of three dimensional planning to buildings and streets—planning on hilly lands—relation of buildings to site and surroundings—formal and informal treatment in planning.

Planning and community—regional basis.

1.3. *Town Planning Practice*—Conception of Town planning—Town planning as an Art—definitions of Town planning—Qualities of a planner.

Different types of towns—grid-iron, radial, linear—advantages and disadvantages of different types.

Requirements of Town planning—Health, amenity and convenience.

Specialised towns—Their nature and plan—specialised streets in towns.

Survey—Physical and civic.

Survey information and sources—Purposes of survey.

Physical features—Geology, topography, contours, rainfall, wind, etc.

Historical—Growth of old maps—archæological remains—old buildings.

Communications—Roads, railways—waterways—air-ways—transport systems—road-traffic data and survey—road accidents and accident-points.

Industrial survey—Different types of industry—distribution of different types—offices—shops—docks—ware-houses—go-downs—light and heavy industries

Health and Vital Statistics—Population—increase and decrease—density—occupational structure and daily movement—size of communities—social statistics—mass observation.

Birth and death rates—Population forecasting—causes of death—unhealthy areas—types of buildings—age—obsolescence. Open Spaces—different kinds and distribution of public and private open spaces (formal and informal).

Administration and Law.

Public Services—Water-supply—sewerage—refuse disposal—gas—electricity.

Aerial Survey—Principles and how it is done.

Towns—suburbs—dormitory towns—garden cities—new satellite towns.

**Zoning**—Use, height, density zonings—residential, industrial and agricultural zones—principles in different countries and details.

**Different types of communication**—Their advantages and disadvantages.

**Sections of different types of roads in different zones**—Airports and runways and terminal buildings—restriction of height of neighbouring buildings.

**Different types of buildings**—Residential, commercial, industrial—educational—recreational and civic buildings.

**Requirements—numbers—spacing—coverage—height—grouping and relation to plan as a whole.**

**Architectural control of buildings.**

**Land utilisation**—Site planning and estate development—details of all requirements.

**Industrial and Factory planning.**

(vi) 2. 5. *Town and City Planning, Regional Planning*—Planning of new towns, zones—details and other detailed considerations.

**City Centre planning**—Planning of road system—traffic roundabouts and fly-overs in built-up-areas.

**Town Improvement schemes and slum clearance.**

**Regional planning**—Regional communication system—national highways or motorways—arterial roads—siting in relation to different zones. Regional characteristics—arable and pasture. Afforestation—mountainous areas, etc.

**Village zones and farms.**

**Master plan**—Sources of informations—survey—detailed requirements in Master plan.

**Development plan and redevelopment plan**—Central area redevelopment scheme—stage plan, etc.

(vii) *Sessional Work*—

(a) 1.7. *Studio Work*—Historical studies—Drawings of plans of some historical and present towns and cities—Drawings of different types of road-sections—'boulevards', etc.—Historical studies of 'places'—gardens—village plans—site planning—estate planning—neighbourhood plans—group of buildings, e.g., Civic Centre—holiday camps—factory plans—planning of gardens and parks—sewage disposal and water-supply schemes.

(b) 2.7. *Planning Project and Thesis*—Complete Physical and Civic Survey of a Region including a town—Report of Survey and drawings—Conclusions from survey—The 'Master plan' or the 'Development plan' Survey for the Central area including calculation of 'Floor-space-index'—Report of survey and drawings—Central area redevelopment plan—stage plans.

**Drawing aerial perspectives and preparing models for planning schemes.**

**Thesis on any Town Planning Research Subject.**

## CHAPTER LII-B

### BACHELOR OF ARCHITECTURE EXAMINATION

1. The Examination for the Degree of Bachelor of Architecture will be held twice a year approximately at 6 monthly intervals at such time and place as the Syndicate shall determine, the approximate date to be notified in the calendar.

2. Any under-graduate or graduate of the University who has passed the Intermediate Examination with Mathematics, Chemistry and Physics may be admitted to the Examination provided he has prosecuted a regular course of study in an institution affiliated to the University in respect of Bachelor's Degree Course in Architecture for not less than 5 academic years after passing the Intermediate Examination and he is certified by the Principal to be fit to take the Examination.

3. The Examination for the Degree of Bachelor of Architecture shall be divided into three parts and in subjects as prescribed in Sec. 12 below and according to the limits laid down in Section 13 below :—

(a) Bachelor of Architecture Examination Part I—Ordinarily to be taken at the end of the first year.

(b) Bachelor of Architecture Examination Part II—Ordinarily to be taken at the end of the third year and provided the candidate has already passed the B.Arch. Examination Part I.

(c) Bachelor of Architecture Examination Part III—Ordinarily to be taken at the end of the fifth year and provided the candidate has already passed the B.Arch. Examination Part II.

4. (a) A candidate may be permitted to appear in any or all of the subjects mentioned below at the end of the 2nd-year and/or approximately 6 months thereafter subject to his completing the courses in each subject, provided he is certified by the Principal to be fit to take the Examination. Such a candidate will obtain credit for those subjects in which he passes when appearing at the B.Arch. Part II Examination.

Applied Mechanics and Theory of Structure (Paper).

Surveying (Paper).

Surveying (Sessional).

Services and Equipment (Paper).

Sociology and Economics (Paper).

(b) A candidate may be permitted to appear in any or all of the subjects mentioned below at the end of the 4th-year and/or approximately 6 months thereafter subject to his completing the courses in each subject, provided he is certified by the Principal to be fit to take the Examination. Such a candidate will obtain credit for those subjects in which he passes when appearing at the B.Arch. Part III Examination.

Electrical Technology and illumination (Paper).

Advanced Materials and Construction (Paper).

Materials Laboratory (Sessional).

Architectural Acoustics (Paper).

Air-Conditioning and Mechanical Equipment (Paper).

5. In order to pass the Examinations—Part I, Part II and Part III—a candidate must obtain 40 per cent. of the full marks of each subject and half of the aggregate of total marks prescribed for each part of the Examination. In order to be placed in the first class a candidate must obtain two-thirds of the aggregate marks of the B.Arch. Part III Examination. A successful candidate getting less than two-thirds will be placed in the second class. The candidate who is placed first on the first class shall receive a gold medal and a prize of books of the value of Rs. 200, provided that he has not taken more than 2 years in passing B.Arch. Part III Examination after passing B.Arch. Part II Examination.

6. A candidate must pass the Part I Examination within a period of two years from the date of admission to the course, Part II Examination within a period of three years from the date of passing the Part I Examination and Part III Examination within a period of three years from the date of passing the Part II Examination. If he fails to do so, he will have to prosecute a fresh entire prescribed course of study for the part in which he has failed in order to be eligible to appear again at the Examination concerned.

7. Every candidate for admission to the Examination shall send to the Controller of Examinations his application with a certificate in the form prescribed by the Syndicate and with the fee prescribed below at least a month before the date fixed for the commencement of the Examination :

For Part I Examination or part thereof ..	Rs. 30
For Part II Examination or part thereof ..	Rs. 50
For Part III Examination or part thereof ..	Rs. 60

A candidate who fails to pass or to present himself for the Examination shall not be entitled to refund of the fee.

8. A candidate who fails in one subject only and by not more than 5 per cent. of the full marks in that subject, but has shown merit by gaining 60 per cent. or more in the aggregate marks of the Examination shall be allowed to pass.

9. If the Board of Examiners are of the opinion that in the case of any candidate not covered by the preceding Regulations consideration ought to be allowed by reason of high proficiency in a particular subject or in the aggregate they shall report the case to the Syndicate and the Syndicate may pass such a candidate.

10. (a) A candidate who obtains in the B.Arch. Part I Examination 50 per cent. of the marks in the aggregate, but

fails in not more than two subjects may be allowed to appear on the recommendation of the Principal of the College in subsequent B.Arch. Part I Examination in the subject or subjects in which he has failed on payment of the prescribed fee of Rs. 30 and he shall be deemed to have passed the B.Arch. Part I Examination if he passes in the subject or subjects within the time limit specified in Section 6 above.

(b) Save as provided in (a) above all other unsuccessful candidates will have to appear in all the subjects at a subsequent Examination on payment of the like fee of Rs. 30.

(c) A candidate who obtains in the B.Arch. Part II Examination 50 per cent. of the marks in the aggregate, but fails in not more than two subjects may be allowed to appear on the recommendation of the Principal of the College in a subsequent B.Arch. Part II Examination in the subject or subjects in which he has failed on payment of the like fee of Rs. 50 and he shall be deemed to have passed B.Arch. Part II Examination if he passes the subject or subjects within the time limit specified in Section 6 above.

(d) Save as provided in (c) above all other unsuccessful candidates will have to appear in all the subjects other than those in which he may have already obtained credit under Section 4 at a subsequent Examination on payment of the like fee of Rs. 50.

11. As soon as possible after B.Arch. Examination—Part I, Part II and Part III—the Syndicate shall publish lists of successful candidates in order of merit. Every candidate on passing Part II and Part III Examination shall receive a certificate in the form prescribed in the Appendices A and B.

12. The subjects prescribed for the Bachelor of Architecture Examination—Part I, Part II and Part III and distribution of marks are as follows :—

*Part I*

1. English, Current Orientation and Civics (Paper)	..	100
2. Physics (Paper)	.. ..	50
3. Physics Laboratory (Sessional)	.. ..	50
4. Chemistry (Paper)	.. ..	50
5. Chemistry Laboratory (Sessional)	.. ..	50
6. Mathematics (Paper)	.. ..	100
7. History of Culture (Paper)	.. ..	100
8. Materials and Détails of Construction (Paper)	.. ..	100
9. Détails of Construction (Sessional)	.. ..	100
10. Descriptive Geometry (Paper)	.. ..	100
11. Free-hand Drawing (Sessional)	.. ..	100
12. Architectural Drawing and Design (Paper)	.. ..	200
13. Architectural Drawing and Design (Sessional)	.. ..	400

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1,500

*Part II*

14. Applied Mechanics and Theory of Structures (Paper)	100
15. Surveying (Paper) .. ..	50
16. Surveying (Sessional) .. ..	50
17. Services and Equipment (Paper) .. ..	100
18. Sociology and Economics (Paper) .. ..	100
19. Materials and Details of Construction (Paper) ..	100
*20. Details of Construction (Sessional) .. ..	100
21. History of Architecture (Paper) .. ..	100
22. Specification and Estimating (Paper) .. ..	100
23. Structural Design (Paper) .. ..	100
*24. Free-hand Drawing, Colouring and Graphic Presentation (Sessional) .. ..	200
25. Shop (Carpentry, Modelling, Sculpture) (Sessional)	100
26. Sanitation (Paper) .. ..	100
27. Architectural Design and Drawing (Paper) ..	200
*28. Architectural Design and Drawing (Sessional) ..	400
29. Interior Decoration (Sessional) .. ..	100
	<hr/> 2,000

*Part III*

30. Electrical Technology and Illumination (Paper) ..	100
31. Advanced Materials and Construction (Paper) ..	100
32. Materials Laboratory (Sessional) .. ..	100
33. Architectural Acoustics (Paper) .. ..	100
34. Air-conditioning and Mechanical Equipment (Paper)	100
35. Theory of Structures and Design (2 papers) ..	200
36. Architectural Design (Paper) .. ..	200
37. Architectural Design (Sessional) .. ..	200
38. Professional Practice (Paper) .. ..	100
39. Quantity Surveying and Valuation (Paper) ..	100
40. Principles of Urban and Regional Planning and Landscape Design (Paper).	100
41. Elective Design and Thesis (Sessional) .. ..	400
42. Credit for the Part II Examination .. ..	200
	<hr/> 2,000

\* To be spread over two years.

13. The limits of the subjects shall be as follows :—

### PART I

#### 1. *English, Current Orientation and Civics—*

*English* : Principles of English Composition, Letters, Précis and Essay writing, Reports, Talks and Debates.

*Current Orientation* : Careers and their meaning, Architecture and Building Industry, Science, Public and Private Works, Profession and Service.

*Civics* : Form of Government, Democracy, Public Opinion, Political parties. Organs of Government, Electorate and its nature, Rights and parties of Citizenship, Civic ideas, Nationalism, United Nations Organisation.

The following subjects are to be treated with reference to their application to Architectural problems :—

#### 2-3. *Physics—*

(a) General properties of matter—Viscosity and Viscometers.

(b) Heat—Thermometry and Calorimetry, Thermal Conductivity and its application.

(c) Optics—Defects of images formed by mirrors and lenses. Different types of eye pieces—Telescope, Microscope, Camera and other optical instruments used by Architects.

(d) Sound—Recording and Production of Sound, Reverberation and Echo.

Elementary Acoustics of Buildings.

(e) Electricity and Magnetism—Primary and Secondary cells, Electro-Magnetic instruments, Measurement of current resistance and voltage. X-ray and Electronics.

(f) Laboratory test of the above theoretical course.

#### 4-5. *Chemistry—*

(a) Brief study of manufacture, use and properties of ferrous and non-ferrous metals as used in buildings. Malleable casting, Forging, rolling and extruding, Corrosion of iron and method of prevention. Paint and Enamel, their properties and composition.

Hard and soft water and process of water softening.

(b) Laboratory test of the above theoretical course.

#### 6. *Mathematics—*

(a) Computation and Mensuration. Use of logarithmic tables, Slide rule, problem of heights and distances, solution of triangles, Mensuration of plane and solid figures, Simpson's rule.

(b) Introduction to Calculus—Function limits continuity, Rules for differentiation, Maxima and minima, Rules for inte-

gration, Simple indefinite integrals, Application to determination of areas, volumes and moment of inertia.

(c) Mechanics—General condition of equilibrium, friction, Velocity, Acceleration, Impulse, impact, Projectile, Governor, Simple Harmonic Motion, Principle of energy.

### 7. *History of Culture—*

General survey of the cultural development in World History from the primitive age to the modern times with more emphasis on Eastern Culture. This should include the visual as well as non-visual aspects of culture, e.g., music, literature, philosophy and religion, etc.

### 8-9. *Materials and Details of Construction—*

*Materials* : Use and properties of stone, brick, tile, lime, cement, sand, *soorkee*, timber and iron.

*Details of Construction* : Brick walls, Bonding, Footings and Foundations, Stone-masonry-types, joints, arches. Timber joints—carpentry—simple roofs ; joinery-doors and windows, C. I. & W. I. fittings, steel sections, etc.

### 10. *Descriptive Geometry—*

Elementary forms, lines, planes, curves, solids, plan, elevation, section and projection. Inter-penetration of solids, Analysis of complex forms (moulding vaults). Axonometric and Isometric projection, Principles of Geometry perspective, Parallel perspective and Angular perspective. Study of shadows and shades of single forms on plain surface and complicated forms on plain and irregular surface. Study of actual shades and shadows on some buildings.

### 11. *Free-hand Drawing—*

Sketching compositions of Geometrical figures and objects. Outdoor sketching of natural forms and actual buildings. Imaginative free-hand compositions.

### 12-13. *Architectural Drawing and Design—*

Scale drawing including measured drawing of actual objects and building portions, Tracing, Lettering, Historical studies—orders, etc. Elementary principles of architectural design, lines, shapes, forms. Composition of proportionally related shapes and forms. Simple design subjects in relation to construction and materials.

## PART II

### 14. *Applied Mechanics and Theory of Structures—*

(a) Strength of material—Stress, strain, elasticity, Hooke's Law, Poisson's Rat, Shell, yield point, working stress, factor



of safety. Repetition and revised stresses, Impact Resilience, Compression, tension and shear.

(b) Theory of structure : Bending moment, Shear Force, Bending moment and Shear force diagram for simply supported and Cantilever beams. Moment of resistance, Moment of Inertia, Radius of gyration, stress, diagram for simple roof trusses. Earth pressure and retaining wall foundation, Deflection of simply supported beams. Simple reinforced concrete members. Design of short columns.

#### 15-16. *Surveying and Levelling—*

(a) Chain Survey : Determination of areas, use of pantograph and planimeter. Equipment and instruments of chain survey—permissible errors and accuracy—use of plane table.

(b) Use of Prismatic compass, Clinometer and sextant.

(c) Use of Levelling instrument—general principle and procedure, contouring.

(d) Use of Theodolite and Method of travers survey and Gale's system, Traverse table—setting out of a building plan.

#### 17. *Services and Equipments—*

Use of modern sanitary equipments, closets, wash hand basin sink, shower, combination fittings, wash fountains, drinking fountain, bath tubs, kitchen equipments, chimney construction, simple hot water supply through coal boiler, gas and electricity. Electric light fittings.

#### 18. *Sociology and Economics—*

*Sociology* : Evolution of family, Tribe, clan and nation, joint family, class and caste. Guilds, Individualism, Socialism, Communism, Rights and duties of an individual in the modern society and democratic state. General features of social organisation in industrial life. Housing, Health, Education and recreation.

*Economics* : Consumption, production and distribution of wealth. National income, capital and labour.

Theory of value, nature of money, demand and supply of money, Banks, Foreign Exchanges, price level.

Building and land economics.

#### 19-20. *Materials and Details of Construction—*

*Materials* : Artificial stone, Artificial marble, Timber products, Veneers, Aluminium, Copper, Lead, Zinc and alloy steel and metals as used in Architectural construction. Tar, paint, varnish, polish, Glass and glass substitutes—use of Asbestos, G. I. sheets and Aluminium sheets.

*Construction* : Pavior's work in plaster, artificial stone, rrazzo marble, Asphalato, Tile and Brick-on-age floor. Tee

and Tile roof, Jack Arch roof R. C. and R. B. C. roof, Hollow brick wall and floor, Terracing, T. W. Trusses, sloping roof with metal and Asbestos sheet, Stair and Railing, Shuttering and Scaffolding. Wood-work in door, windows and frame. Structural framed construction.

## 21. *History of Architecture—*

Development of Indian Architecture from the earliest time to the modern days (*e.g.*, Indus civilization, Buddhist, Hindu, Indo-Aryan, Dravidian, Jain, Mohammadan, etc.).

Parallel architectural development in the rest of the World (*e.g.*, Early Egypt, West Asiatic, Greek, Roman, Byzantine, Ramanesque, Gothic, Renaissance styles in Europe, as well as American, Saracenic, Chinese, Japanese, etc.).

Emphasis should be on the solutions of structural problems and the development of building techniques arising out of socio-economic conditions and cultural influences of the respective countries through the ages.

## 22. *Specification and Estimating—*

*Specification* : Materials used in general building brick, Timber, paint, glass, paviers work. Steel reinforced concrete plaster, whitewash and colourwash, Procedure of work and methods. Pricing.

*Estimating* : Principle of cubing, Taking off, marking headings and abstracting. Bill of Quantities of a simple building, Standard method of measurement.

## 23. *Structural Design—*

Design of walls and foundation, Lintels, Simple Beams, Cantilever beams, R. S. J. Columns, R. C. Slab, R. C. Beam and R. C. Columns, Steel and Timber truss.

## 24. *Free-hand Drawing, Colouring and Graphic Presentation—*

Sketching on site of buildings and natural objects. Architectural rendering in different mediums.

Theory of colours—hue, value, chroma, etc., contrast and harmony Mixing and application of colour in flat and grades washes.

Rendering of sheets composed of two dimensional pattern forms textiles, flooring, posters, etc.

Research in the organisation of light and colour into two or three dimensions.

Space organisation with light.

*Graphic Presentation* : Lettering, typographical layout. Photomontage charts, diagrams, etc. Photographic observation of surfaces, textures and structures. Documentation of subjects related to architectural problems.

25. *Shop (Carpentry, Modelling and Sculpture)*—

To develop familiarity with the qualities and influences of commonly used building materials.

Use of hand and power tools to inculcate techniques required in future subjects for making quick and accurate architectural models and full-scale furniture designs.

26. *Sanitation*—

Basic principle of Hygiene and Sanitation. Method of disposal of sewage and waste matter. Incineration. Septic tank, Soak well, water carriage system of sewer, S. W. Pipe and masonry drain, Surface drainage. Method of laying water supply. Sources of water, pipe water supply, soft and hard water. Municipal rules regarding use of water for flushing and drinking purposes. Tubewell reservoir and distribution of water in buildings.

27-28. *Architectural Design and Drawing*—

Analysis of programmes—Investigation of requirements and determination of solution for building problems selected from many fields of human activity (habitation, education, health, recreation, government, industry, merchandising and transportation).

Study of accommodation, horizontal and vertical circulation, organisation of spaces of different kinds.

Inter-relation between exterior expression and internal plan. Relationship of buildings to physical and social environment.

Study of site

Orientation

Climatic planning

Selection of appropriate materials and construction. Investigation of typical details such as windows, copings, stairways etc.

*Note.*—Studio work should include Sketch problems (6 to 12 hours).

Project drawings

Working drawings

Perspective

29. *Interior Decoration*—

Brief study of the past and present furniture of various countries.

The room : Purpose, plan, ideals and aims—Practical and Aesthetic Character and Style, Social and Economic Considerations. Equipment and furnishing Materials and Technique—Lighting and colour. Formal and Emotional.

Exercises in furnishing and Decorating.

Rooms in domestic houses.

Public lobbies and entrances of hotels and cinemas.

Auditoriums—Cinema and Theatre.

Other public places of eating and entertainment.

With the help of coloured perspective and architectural models.

### PART III

#### 30. *Electrical Technology and Illumination—*

Mechanical. Thermal and Electrical Units and standard ; Simple laws of Electrical Circuits Conductor and insulators cells and batteries, wiring for domestic installation, low and medium pressure distribution in A. C. and D. C. system ; I. E. E. rules and standard sizes of wires and cables, A. C. and D. C. machines ; Converter. Transformer, Rectifier. Commercial measuring system ; Megger testing and earthing system ; Lightning conductor, general principle of illumination and standard of lighting for residence, office, Workshop, Theatre, Cinema, Showroom, Road and Bridges, Flood-lighting ; Neon Sign ; Fluorescent lighting.

#### 31. *Advanced Materials and Construction—*

Use of synthetic material—plastic, Building boards, Asbestos, Tempered pressed wood. Use of Aluminium, Nickel, Stainless Steel, Copper and other metallic alloy. Use of cork, glass, silk, Eelgrass and other insulating material.

Construction of ceiling with building boards, pressed metal asbestos sheet, fibrous plaster, timber and other material. Use of Precast concrete tile on bitumen for water and heat-proofing ; hollow bricks, encaustic tiles, steel and metal windows and glazing ; use of glass brick, vitrolits and non-actinic glass. Sliding and folding doors, rolling shutters, fitting shop front, skysigns, use of special finish to buildings—cement paint, wall preparation for frescoe painting and spray painting.

#### 32. *Materials Laboratory—*

Making physical test of common building material—cement, cement mortar, brick, steel, timber, etc.

#### 33. *Architectural Acoustics—*

Sound, its nature, source, propagation, reception and measurement, loudness, echo, reverberation, resonance, interference and absorption, principle of architectural analysis, shape, size, volume, and density of an Auditorium, materials for sound proofing—boards, plaster, quilt, etc., sound proof paint, design for good acoustics for cinema, theatre, music hall, broadcasting, studio and lecture hall.

34. *Air-conditioning and Mechanical Equipment—*

Thermal balance and human comfort, general principles of ventilation, heating and cooling, requirement in different circumstances, dwelling house, office, factories, cinema and theatre, hospital, train, ship and aircraft, machineries and equipment for ventilation, heating and refrigeration, ducts and pipes, design and layout.

Hot water supply—Pump and accelerators, boiler, cylinder, electric and gas geyser.

35. *Theory of Structures and Design*

Deflection of beams, simple beams, cantilevers, graphical method of determination of deflection, encastee beams, continuous beams. Theory of three moments. Columns and slenderness ratio, eccentric loading on columns, combined bending and shear torsion, arches, plate girder and trussed girders.

Design of framed structure in steel and reinforced concrete, plate girder, trussed girder, R. C. raft foundation, R. C. Domes and Pyramidal roof; Earthquake resisting structure, Arches and vaults Pressurised concrete.

36-37. *Architectural Design*

Consolidation of previous design experience in advanced problems in architectural design.

Study in thorough details of particular conditions encountered in larger buildings, such as, circulation, control and safety of crowds, accommodation of vehicles and freight, and the use of lifts and special equipment. Housing and Prefabricated houses.

Presentation of one detailed problem at the end of each year with studies of structure, assembly of materials, airconditioning sanitation, acoustics, electricity and illumination.

*Note.*—Studio work should include—

- Sketch problems (6 to 12 hours)
- Project drawing
- Working drawing
- Full size detail drawing
- Perspective
- Models.

38. *Professional Practice .*

Function and duty of an Architect, his relation with consulting Engineer, Surveyor, Client and Contractor.

Office administration, Book-keeping, Filing of drawings and letters.

Professional conduct rules and scale of fees.

Different types of contract and method of calling tender.

Arbitration-Umpire-Indian Arbitration Act.

39. *Quantity Surveying and Valuation*

General principle of taking off, abstracting and detailing of building work including structural steel work, plumbing and electrical installation, specifications.

General principle of valuation on rental and cost of land and building lease-held, billing, compensation, depreciation, betterment and dilapidation.

40. *Principles of Urban and Regional Planning and Landscape Design*

Historical study of town planning, evolution of modern cities and relation of Architecture and Engineering in city development in urban and rural areas with modern amenities. Town planning Legislation in India. Relationship to building to its setting, study of tree structure for garden, parks and roads. Garden planning for rural and urban setting, Parkways, National Parks, River front.

41. *Elective Design and Thesis*

The student to select his own problem with the approval and direction of the Professor.

Research, development of programme, and the designing of buildings with particular attention to thorough consideration of social, economic and technical influences and integration of these factors in the solution of the problem.

Research and design report to be submitted in duplicate.

Required drawings—1/8" scale working drawings

1/2" scale details

Model or perspective

Students will be required to present the report and the drawings personally to a jury consisting of Professor of Architecture, Professor of Civil Engineering and two other practising architects.

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## CHAPTER LII-C

### MASTER OF PLANNING

1. An examination for the Degree of Master of Planning will be held annually at such time and place as the Syndicate shall determine, the approximate date being notified in the Calendar.

2. A candidate who has passed the Degree of Bachelor of Architecture may be admitted to the examination for the Degree of Master of Planning, provided he has undergone a course of Post-Graduate training for a period of two years in the prescribed subjects in the University or in an Institution recognised for the purpose to the satisfaction of the Head of the Institution.

3. Every candidate for the examination for the Degree of Master of Planning shall send to the Controller of Examinations an application with a certificate in the form prescribed by the Syndicate together with a fee of Rs. 200 at least four weeks before the date fixed for the examination.

A candidate who fails to pass or present himself for the examination shall not be entitled to a refund of the fee. A candidate may be admitted to one or more subsequent examinations of the same standard on payment of the prescribed fee on each occasion.

4. The subjects for the examination and marks shall be distributed as follows :—

GROUP I		Marks
1. History of Planning	..	150
2. Philosophy of Planning	..	100
3. Regional Characteristics	..	150
4. Planning in relation to Resources—		
(a) Industry	..	50
(b) Agriculture	..	50
(c) Irrigation	..	50
(d) Communication	..	50
(e) Forestry	..	50
(f) Geology	..	50
		— 700

GROUP II		Marks
Planning in relation to Social Organisation—		
(a) Culture and Religion	..	50
(b) Politics	..	50
(c) Economics	..	50
(d) Sociology	..	50
(e) Law	..	50
(f) Administration	..	50
		— 300
GROUP III		Marks
Planning in relation to Technical Methods—		
(a) Architecture	..	150
(b) Civil Engineering	..	150
(c) Surveying	..	50
(d) Planning Law	..	50
(e) Landscape Design	..	100
		— 500
		1,500

Each paper shall be of three hours and shall carry 100 marks.  
Each half-paper shall be of two hours and shall carry 50 marks.

5. The courses of study shall be as follows :—

*Series I—Introduction to Planning*

Objects of Planning, Planning and the Community, Scientific Aspect, the Regional Basis.

*Series II—History of Town and Country Planning*

India, Egypt, Assyria, China, Greece, Roman Empire, Mediaeval, Renaissance, Baroque, the Paleotechnic Age, Industrial Development, the Neotechnic and Biotechnic Phases.

*Series III—Philosophy of Planning*

The Individual and the Community, the World as Home, the Back-ground of Living. Possibilities of Individual and Collective Life. Time and Space. The Biological Influence, influence of Religion on Planning, Flexibility and Renewal, the Social Concept of the Community, the Basis of Urban and Regional Order, Background of Higher Life Forms.

*Series IV—Regional Characteristics*

(a) Types of Country—

- (1) Agriculture, Arable and Pasture.
- (2) Aforestation.
- (3) Mountains Areas.
- (4) Special Features.



- (b) Landscape Aesthetics, Setting of villages and farms.  
*Planning in relation to the following subjects :*

*Series V—Resources*

- (a) Industry, (b) Agriculture, (c) Irrigation, (d) Communications, (e) Forestry, (f) Geology.

*Series VI—Theory of Social Organisation*

- (a) Culture and Religion, (b) Politics, (c) Economics, (d) Sociology, (e) Law, (f) Local Government Administration.

*Series VII—Technical Methods*

- (a) Architecture, (b) Civil Engineering, (c) Surveying, (d) Planning Law, (e) Landscape Design.

*Series VIII—Surveys*

- (1) Physical Features
  - (a) Geology, (b) Contours, (c) Rivers, etc., (d) Rainfall, Winds, etc.
- (2) History, Archaeology and Architecture
  - (a) Study of growth from Old Maps.
  - (b) Archaeological remains, sites, etc.
  - (c) Ancient buildings.
  - (d) Architectural Character, Quality and Materials.
- (3) Communications
  - (a) Roads, (b) Railways, (c) Waterways, (d) Air Transport, (e) General Accessibility.
- (4) Industrial Survey
  - (a) Classification of Industry, (b) Economic Geology, (c) Distribution, docks, offices, shops, warehouses, godowns, etc., (d) Industrial siting.
- (5) Population
  - (a) Number, Increase and Decrease.
  - (b) Occupations and Movement (diurnal and terminal).
  - (c) Density.
  - (d) Sizes of Communities.
  - (e) Social Statistics, Mass Observation.
- (6) Health and Housing
  - (a) Birth and Death Rates, (b) Disease Statistics, (c) Insanitary Areas, (d) Building Types.
- (7) Open Space
  - (a) Recreation, (b) Parks, (c) Open Space in relation to building coverages, (d) Formal and Informal Open Spaces.
- (8) Administration and Law
  - (a) Local Laws, (b) Planning Acts in India and other countries.

## (9) Services

(a) Water supply, (b) Drainage, (c) Electricity, (d) Gas.

*Studio Work*

## FIRST-YEAR

- (1) Historical Studies, (2) District Survey Plans, (3) Village Plans for different Areas, (4) Related Services, (5) Building Groups, *i.e.*, City Centres, Community Groups, Industrial Layouts. Recreation Areas.

## SECOND-YEAR

- (1) City and Regional Survey Plans, (2) Town and City Plans, (3) Regional Plans, (4) Aerial Prospectives and Models of Planning Schemes.

6. The limits of the subjects shall be determined from time to time, and books prescribed to indicate the standard of knowledge required, by the Syndicate on the recommendation of a body of five experts to be nominated by the Syndicate for the first three years after the institution of the course of studies for the Master of Planning and thereafter on the recommendation of the Board of Studies in Architecture.

7. The examination shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

8. As soon as possible after the examination, the Syndicate shall publish lists of those who have passed the examination, arranged in three classes and in order of merit. Every successful candidate shall receive a Diploma in the form entered in Appendix A.

9. The pass-marks for each of the examinations shall be 40 per cent. in each subject comprised in a group and half of the aggregate in each group. Candidates obtaining 60 per cent. of the marks in the aggregate shall be placed in the Second Class and those obtaining 70 per cent. in the First Class.

10. The candidate who is placed first in the First Class shall receive a gold medal and a prize of books to the value of Rs. 200, and the candidate who is placed second in the First Class shall receive a silver medal and a prize of books to the value of Rs. 100.

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## CHAPTER LII-D

### MASTER OF ARCHITECTURE

1. Any candidate who has passed the Degree of Bachelor of Architecture not less than two years previously may offer himself as a candidate for the Degree of Master of Architecture.

2. Every candidate shall state in his application the special subject within the purview of the Regulations for the Degree of Bachelor of Architecture, upon a knowledge of which he rests his qualification for the Master's Degree, and shall, with the application, transit three copies, printed or type-written, of a constructive thesis that he has composed treating scientifically some special portion of the subject so stated, embodying the result of research, or showing evidence of his own work, whether based on the discovery of new facts observed by himself or of new relations of facts observed by others or tending generally to the advancement of Indian architecture. The candidate shall indicate generally in a preface to his thesis and specially in notes, the sources from which his information is taken, the extent to which he availed himself of the work of others, and the portions of the thesis which he claims as original; he shall further state whether his research has been conducted independently, under advice, or in co-operation with others, and, in what respects his investigations appear to him to tend to the advancement of Indian Architecture.

3. Every candidate may also forward with his application three printed copies of any original contribution or contributions to the advancement of the science professed by him, or any cognate branch of science, which may have been published by him independently or conjointly, and upon which he relies in support of his candidature.

4. No application shall be entertained unless two persons from the rank of Master of Architecture, Chartered Architect or two Doctors in any Faculty of this University or of a University approved by the Syndicate from time to time shall have testified, to the satisfaction of the Syndicate, that in habits and character, the candidate is a fit and proper person for the Degree.

5. Every candidate shall forward with his application a fee of Rs. 200. No candidate who fails to pass or present himself for the examination shall be entitled to claim a refund of the fee.

6. The thesis mentioned in Regulation 2 and the original contributions, if any, mentioned in Regulation 3, shall be referred by the Syndicate to a Board of three examiners.

7. If the thesis is approved by the Board, he shall not be required to submit to any further written examination ; but he may be required by the Board, at their discretion, to appear before them to be tested orally or practically, or by both these methods, with reference to the thesis, and the special subject selected by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the oral and practical examinations, if any, and if the Syndicate, upon the report, consider the candidate worthy of the Degree, they shall cause his name to be published, with the subject of his thesis, and the titles of his published contributions, if any, to the advancement of Indian Architecture.

8. A Diploma under the seal of the University and signed by the Vice-Chancellor shall be delivered at the next Convocation for conferring the Degree on each candidate who has qualified for the Degree.

9. Every candidate shall be at liberty to publish his thesis, and the thesis of every successful candidate shall be published by the University, with the inscription "Thesis approved for the Degree of Master of Architecture in the University of Calcutta."

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## CHAPTER LIII

### DOCTOR OF SCIENCE (ENGINEERING)

1. Any Bachelor of Engineering of the University of Calcutta may offer himself as a candidate for the Degree of Doctor of Science (Engineering).

2. Every candidate shall state in his application the special subject within the purview of the Regulations for the Degree of Bachelor of Engineering, upon a knowledge of which he rests his qualifications for the Doctorate, and shall, with the application, transmit three copies, printed or type-written, of a thesis that he has composed, treating scientifically some special portion of the subject so stated, embodying the result of research or showing evidence of his own work, whether based on the discovery of new facts observed by himself, or of new relations of facts observed by others, or tending generally to advance engineering knowledge or practice. A thesis on a new application of scientific principles or an investigation of methods or materials of practical importance in some branch of engineering, will be taken to comply with the requirements. The candidate shall indicate generally in a preface to his thesis and specially in notes, the sources from which information is taken, the extent to which he has availed himself of the work of others, and the portions of the thesis which he claims as original; he shall further state whether his research has been conducted independently, under advice, or in co-operation with others, and in what respects his investigations appear to him to advance engineering knowledge or practice.

3. Every candidate may also forward with his application three printed copies of any original contribution or contributions to the advancement of engineering knowledge or practice, or of any cognate branch of science, which may have been published by him independently or conjointly, and upon which he relies in support of his candidature.

4. No application shall be entertained unless two Members of the Faculty of Engineering or two Doctors in any Faculty of this University or of a University approved by the Syndicate from time to time shall have testified, to the satisfaction of the Syndicate, that since graduating as Bachelor of Engineering, the candidate has practised his profession with repute for five years, and that in habits and character, he is a fit and proper person for the Degree of Doctor.

5. Every candidate shall forward with his application a fee of Rs. 300. No candidate, who fails to pass or present him-

self for examination, shall be entitled to claim a refund of the fee.

6. The thesis mentioned in paragraph 2 and the original contributions, if any, mentioned in paragraph 3, shall be referred by the Syndicate to a Board consisting of the Dean of the Faculty of Engineering and two other persons.

7. If the thesis is approved by the Board, and if the candidate has obtained a first class at the examination for the Degree of Bachelor of Engineering, he shall not be required to submit to any further written examination; but he may be required by the Board at their discretion, to appear before them to be tested orally or practically, or by both these methods with reference to the thesis and the special subject selected by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the oral and practical examinations, if any; and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Science (Engineering), they shall cause his name to be published with the subject of his thesis and the titles of his published contributions (if any) to the advancement of Engineering knowledge and practice and of Science generally.

8. If the candidate is a person who has obtained a second class at the examination for the Degree of Bachelor of Engineering and if his thesis is approved by the Board, he shall be required to submit to a written examination.

Two papers of three hours each shall be set, one upon the special subject mentioned in the application of the candidate and the other upon the subject of the thesis. The candidate may also be required by the Board, at their discretion, to appear before them to be tested orally or practically or by both these methods, with reference to the thesis and the special subject professed by him. The Board shall report to the Syndicate the result of the examination of the thesis and of the written examination, and also the oral and practical examinations, if any; and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Science (Engineering), they shall cause his name to be published, with the subject of his thesis, and the titles of his published contributions (if any) to the advancement of Engineering knowledge and practice and of Science generally.

9. In the case of a candidate falling under the preceding section, if the Board, upon an examination of his thesis and of his original contribution or contributions to the advancement of Engineering knowledge and practice and of Science generally, hold the same to be generally or specifically of such special excellence as to justify the exemption of the candidate from the written examination, he may be so exempted by the Syndicate, provided that the report of the Board shall set forth the fact and the grounds of such exemption.

10. A diploma under the seal of the University, and signed by the Vice-Chancellor shall be delivered at the next Convocation for conferring degrees to each candidate who has qualified for the degree.

11. Every candidate shall be at liberty to publish his thesis and the thesis of every successful candidate shall be published by the University with the inscription : "Thesis approved for the Degree of Doctor of Science (Engineering) in the University of Calcutta."

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## CHAPTER LIII-A

### CERTIFICATES IN MILITARY STUDIES

1. Two examinations for Certificates in Military Studies shall be held annually in Calcutta on such dates as may be prescribed by Army authorities. One shall be on the Junior Course and the other on the Senior Course and shall be called Military Certificate (A) Examination and Military Certificate (B) Examination, respectively. Each examination shall be divided into two parts, *viz.*, Part I and Part II.

2. Every candidate for the Military Certificate (A) Examination must fulfil the following conditions :—

- (i) He must have been a member of the Calcutta University Officers' Training Corps during two successive academic sessions.
- (ii) During such membership he must have undergone individual and collective training in accordance with the syllabuses prepared from time to time by the Government of India, Army Branch, and approved by the University.
- (iii) During this period he must have attended at least 75 per cent. of lectures delivered on selected topics by teachers appointed for the purpose.
- (iv) He must have satisfied the Commanding Officer of the Calcutta University Officers' Training Corps about his conduct, character and regularity of attendance.

Before his admission to the examination he shall produce a certificate from the Commanding Officer of the Calcutta University Officers' Training Corps to the effect that he has fulfilled the above conditions. He shall also produce a certificate of good conduct and diligent study from the head of the institution to which he belongs.

3. In order to be eligible for the Certificate (B) Examination a candidate must have passed the Certificate (A) Examination in Parts I and II two years previously. The other conditions shall be the same as in Section 2 above.

4. Candidates shall pay to the University a fee to be prescribed by the Syndicate for admission to each course of study and examination.

5. Each candidate in order to be successful must pass in Part I and Part II separately. Candidates obtaining 75 per cent. of marks or over shall be declared to have passed with distinction. Certificates shall be issued by the Army authorities on the results of each examination. Such certificates will be



countersigned by the Registrar or the Controller of Examinations.

6. A candidate who fails to pass, or to present himself for the Military Certificate (A) or Military Certificate (B) Examination, may be admitted to any one or more subsequent examinations of the same standard provided he continues to attend classes and parades in the Calcutta University Officers' Training Corps.

7. The result of a candidate who is successful at the Certificate Examination shall be taken into account at the next University Examination at which he appears as indicated below.

#### *I.A. and I.Sc. Examinations*

Marks in excess of 60 obtained by the candidate concerned at the Certificate (A) Examination shall be added to his aggregate and aggregate so obtained shall determine his division and his place in the list of successful candidates at the Intermediate Examinations.

Candidates who take up any optional subject under Chapter XXXI or XXXV of the Regulations, shall not be entitled to the above privilege.

#### *B.A. and B.Sc. (Pass) Examinations and B.Com. Examination*

Marks in excess of 60 obtained by the candidate at the Certificate (A) or Certificate (B) Examination shall be added to the aggregate marks obtained by him at the B.A. or B.Sc. (Pass) or B.Com. Examination, as the case may be.

#### *B.A. and B.Sc. (Honours) Examinations*

A candidate appearing at the B.A. or B.Sc. Honours Examination in any subject shall not get any credit in his Honour-subject for his success at the Certificate Examination. The marks in excess of 60 obtained by him at such examination shall however be added to the aggregate of his total marks.

#### *B.E. Examinations*

Marks obtained by a candidate at the Certificate Examination in excess of 60 shall be added to his aggregate marks at the B.E. Part I or B.E. Part II Examination, as the case may be.

8. The provisions of Section 7 shall be subject to the following conditions :—

- (i) The marks shall be added only if a candidate passes both the Certificate Examination and the University Examination either immediately on completion of his respective studies or in the next following year.

- (ii) The marks shall not be added in the case of a candidate who takes up Military Course as a subject for the I.A. or B.A. Examination.

9. (a) Any candidate for the Intermediate Examination in Arts or Science may take up Junior Military Course as one of his subjects under Group A, Sub-sections (3), (4) and (5), Section 7 of Chapter XXXI or under clause (5), Section 7 of Chapter XXXV provided—

- (i) He becomes a member of the Calcutta University Officers' Training Corps and continues as such during two successive academic sessions, and
- (ii) he attends during this period at least 75 per cent. of the lectures delivered on the following topics by teachers appointed for the purpose :—
  - (1) Discipline, leadership, *esprit de corps*, morale and its importance in war.
  - (2) Organisation of an Infantry Battalion.
  - (3) History of the Army in India.
  - (4) Theory of Small Arms Fire.
  - (5) Map reading and field sketching.
  - (6) Elements of Field craft.
  - (7) Badges and symbols of rank in the Fighting Forces.
  - (8) Military hygiene and camp sanitation.

The Syndicate shall have power to add to, or alter, the list of topics from time to time or prescribe the limits of the topics on the recommendation of the University Officers' Training Corps Committee.

- (iii) He also attends lectures and parades for the Military Certificate (A) or Military Certificate (B) Examination in accordance with the above regulations.

- (b) The marks in this subject shall be distributed as follows :—

- (i) One Theoretical paper, .. 100 marks.
- (ii) Results of the Certificate Examination held under the foregoing provisions, .. 100 marks.

In assessing marks under clause (ii) above the marks obtained by a candidate for the Certificate Examination shall be proportionately reduced.

- (c) In order to pass in this subject a candidate must pass the Military Certificate (A) Examination or Military Certificate (B) Examination in both parts and obtain 30 marks in the Theoretical paper.

10. (a) Any candidate for the Bachelor of Arts Examination may take up Senior Military Course as one of his subjects

under Group A, Sub-sections (3) and (4), Section 6 of Chapter XXXII, provided—

(i) He is a member of the Calcutta University Officers' Training Corps, and continues as such during two successive academic sessions, and

(ii) He attends during this period at least 75 per cent. of the lectures delivered on the following topics by teachers appointed for the purpose :—

(1) General Knowledge of the organisations of the Army, Navy and Air Force (in India).

(2) Indian Military Geography.

(3) Characteristics of modern weapon.

(4) Principles and development of tactics ; study of selected campaigns.

(5) Principles of Military Law in India.

(6) Relationship between civil and military administrations and the responsibility of all citizens in an emergency.

(7) Welfare and psychology of man-management ; principles of command.

The Syndicate shall have power to add to, or alter, the list of topics from time to time or prescribe the limits of the topics on the recommendation of the University Officers' Training Corps Committee.

(iii) He also attends lectures and parades for the Military Certificate (A) or Military Certificate (B) Examination, as the case may be, in accordance with the above regulations.

(b) The marks in this subject shall be distributed as follows :—

(i) One theoretical paper . . . . . 100 marks

(ii) Results of the Certificate Examination held  
under the foregoing provisions . . . . . 200 marks

In assessing marks under Clause (ii) above the marks obtained by a candidate for the Certificate Examination shall be proportionately reduced.

(c) In order to pass in this subject a candidate must pass the Military Certificate (A) or the Military Certificate (B) Examination, as the case may be, in both parts and obtain 30 marks in the Theoretical paper.

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## CHAPTER LIII-B

### MASTER OF ENGINEERING (PUBLIC HEALTH)

1. An examination for the Degree of Master of Engineering (Public Health) will be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any candidate who has passed the B.E. Degree Examination of the Calcutta University, or any other Engineering Examination accepted by the Syndicate as equivalent thereto, may be admitted to this examination, provided he has prosecuted the prescribed course of studies in an institution or institutions affiliated to the University for the purpose, for at least one academic year.

3. The Degree will be awarded on the recommendation of the Head of the Institution after the candidate has passed the examination and has in addition undergone practical training in Public Health Engineering works satisfactorily, for at least one year. The period of practical training may be reduced by six months in the case of a candidate who can satisfy the Syndicate regarding his previous experience.

4. Every candidate shall send in his application to sit for the examination with a certificate in the form prescribed by the Syndicate, and a fee of Rs. 100, at least one month before the date of commencement of the examination.

5. A candidate who fails to pass or present himself for the examination shall not be entitled to a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a similar fee on each occasion.

6. The examination shall consist of the following :—

		<i>Marks</i>
Written Papers	I—Sanitary Bacteriology, Biology and Chemistry. . . . .	100
	II—Public Health Administration and Law, Epidemiology, and Statistics	100
	III—Public Health Engineering—I (Water Supply, Drainage and Sewerage)... .	100
	IV—Public Health Engineering—II (Water Purification, Sewage and Refuse Disposal). . . . .	100

Written Papers	{	V—Public Health Engineering—III (General Sanitation, Hospitals, Housing and Town Planning, Ventilation, Food Sanitation, Control of Insect Enemies, etc.). ..	100
		VI—Public Health Engineering—IV (Design, Estimating and Construction of Public Health Engineering Works). ..	200
		VII—Public Health Engineering—V (Malaria Engineering). ..	100
		VIII—Public Health Engineering—VI (Industrial Hygiene, Engineering and Industrial Wastes Disposal)..	100
		IX—Sessional and practical work .. ..	300
		X— <i>Viva Voce</i> .. ..	200
Total ..			1400

7. In order to pass, a candidate must obtain at least 40 per cent. of the total marks in each of the above, and 50 per cent. of the aggregate. Any candidate who has failed in one of the above by not more than 5 per cent. of the marks for that item and has shown merit by securing 60 per cent. or more in the aggregate shall be allowed to pass.

A candidate who obtains more than two-thirds of the aggregate shall be placed in the First Class.

8. As soon as possible after the examination the Syndicate shall publish a list of successful candidates. The names of those who have passed in the First Class will be arranged in order of merit. The names of other successful candidates will be published in alphabetical order.

9. The limits of the subjects for the course of studies are as follows :—

- (1) Sanitary Bacteriology—Bacterial environment, metabolism, carbon and nitrogen cycles. The role of bacteria. Collection of samples of water, sewage, soil, air, milk, etc., sterilisation.
- (2) Sanitary Biology and Chemistry—Algae, fresh water biology, typical organisms of sewage, sludges, activated sludge, trickling filters, etc. River pollution and beach pollution and their effects. Life of animals, insects, etc., concerned in the transmission of important diseases. Disinfection, fumigation, disinfestation. Elementary Physiology and nutrition.

(3) **Epidemiology and Public Health Administration**—Origin and spread of the more common diseases, such as Malaria, Small-pox, Cholera, Plague, Typhoid, Typhus, Influenza, Tuberculosis, etc. Relation between environment and health. Personal Hygiene and Prophylaxis. Organisation and administration of Public Health in India and elsewhere. Port health and quarantine.

(4) **Statistics**—General and vital statistics. Application of statistics to Engineering problems of rainfall, run off floods, population growth, sewage and water treatment.

(5) **Water Supply and Sewerage**—

(a) **Water Supply**—Design of projects of various types. Methods of preliminary investigation of new projects. Estimates of requirements of water, and the development and conservation of various types of sources of water supply. Rainfall, run off and yield of catchments. Statistical analysis of date and estimation of minimum yield, maximum floods, etc. Ground water. Relation between geology and water supplies. Yield and development of wells and tube wells. Design and construction of river intakes, storage works, clear water and service reservoirs, balancing tanks, stand pipes, pumping stations, etc. Design of pumping plants, air lift systems, etc. Distribution systems, pressure and capacity. Specification and construction of water works, pipe lines and auxiliaries. Plumbing. Hot water supply. Economics and maintenance of water works.

(b) **Drainage and sewerage**—Design and investigation of sewerage and drainage projects. Estimation of sewage, infiltration of ground water and storm water from data on population, soil, intensity and duration of storms, etc. Hydraulics and design of separate sewers, combined sewers and drains, syphons, separators, manholes, silt pits, etc. Ventilation, cleansing and maintenance of drains and sewage pumping stations and equipment. House drainage.

Provided that it shall be competent for the Senate to direct changes in the subjects and/or limits of subjects for the courses of studies, such changes being effected after consulting the Faculties of Engineering and Medicine.

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## CHAPTER LIV

### ACADEMICAL COSTUME

Graduates shall wear—

- (i) *Dhoti* and either a black coat or a white *punjabi*,  
Or,
- (ii) White trousers and a black *chapkan* or *achkan*.  
Or,
- (iii) European dress and a college cap.

They also shall wear Gowns and Hoods for the several degrees as described below :—

*For the Degree of B.A.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of dark blue silk.

*For the Degree of B.Com.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of white silk.

*For the Degree of B.Sc.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of light blue silk.

*For the Degree of LL.B.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of green silk.

*For the Degree of M.B.B.S.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of scarlet silk.

*For the Degree of B.E.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of orange-coloured silk.

*For the Degree of B.T.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged ~~black~~ inside with a border of purple-coloured silk.

*For the Degree of Master in the Faculties of Arts,  
Science and Law*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, with a lining of silk corresponding in colour with the inside border of the Hood for Bachelor of the Faculty.

*For the Degree of Doctor of Philosophy*

A deep purple silk Gown with full sleeves and with a facing of dark blue satin. The Hood shall be of scarlet silk with a lining of dark blue satin.

*For the Degree of Doctor of Literature*

A deep purple silk Gown with full sleeves and with a facing of white satin. The Hood shall be of scarlet silk with a lining of white satin.

*For the Degree of Doctor of Science*

A deep purple silk Gown with full sleeves and with a facing of light blue satin. The Hood shall be of scarlet silk with a lining of light blue satin.

*For the Degree of Doctor of Law*

A deep purple silk Gown with full sleeves and with a facing of green satin. The Hood shall be of scarlet silk with a lining of green satin.

*For the Degree of Doctor of Medicine, Master of  
Surgery and Master of Obstetrics*

A deep purple silk Gown with full sleeves and with a facing of scarlet satin. The Hood shall be of scarlet silk with a lining of scarlet satin.

*For the Degree of Doctor of Science (Public Health)*

A deep purple silk Gown with full sleeves and with a facing of golden yellow satin. The Hood shall be of scarlet silk with a lining of golden yellow satin.



*For the Degree of Doctor of Science (Engineering)*

A deep purple silk Gown with full sleeves and with a facing of orange-coloured satin. The Hood shall be of scarlet silk with a lining of orange-coloured satin.

*For Honorary Degrees*

In case of recipients of Honorary Degrees the gown shall be of scarlet red colour with facing of the appropriate Faculty.

Provided that the above changes in the Regulations be enforced with effect from the Annual Convocation of 1932, and that Graduates admitted to these Degrees before 1932, will be allowed to use academic costumes of the old pattern unless they choose to use the new costume.

(Note.—The facing of satin will be four inches in width.)

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## APPENDIX A

### MATRICULATION EXAMINATION

I certify that \_\_\_\_\_, aged \_\_\_\_\_ on the 1st of March, 19 \_\_\_\_\_, duly passed the Matriculation Examination held in the month of \_\_\_\_\_, 19 \_\_\_\_\_, and was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_\_. \_\_\_\_\_ Controller of Examinations.

### INTERMEDIATE EXAMINATION IN ARTS (OR SCIENCE)

I certify that \_\_\_\_\_ duly passed the Intermediate Examination in Arts (or Science) held in the month of \_\_\_\_\_, 19 \_\_\_\_\_, and was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_\_. \_\_\_\_\_ Controller of Examinations.

### INTERMEDIATE EXAMINATION IN ARTS (OR SCIENCE) (COMPARTMENTAL)

I certify that \_\_\_\_\_ of \_\_\_\_\_ duly passed the Intermediate Examination in Arts (or Science) having been successful at the Compartmental Examination held in the month of \_\_\_\_\_, 19 \_\_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_\_. \_\_\_\_\_ Controller of Examinations.

### BACHELOR OF ARTS (OR SCIENCE)

#### *Pass Diploma*

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Arts (or Science) in this University at the Annual Examination in the year 19 \_\_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_\_. \_\_\_\_\_ Vice-Chancellor.

#### *Diploma for those who pass with "Distinction"*

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Arts (or Science) in this University with Distinction at the Annual Examination in the year 19 \_\_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_\_. \_\_\_\_\_ Vice-Chancellor.

## BACHELOR OF ARTS (OR SCIENCE)

*Honours Diploma*

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Arts (or Science) with Honours in this University at the Annual Examination in the year 19\_\_\_\_, and that he was placed in the Class in \_\_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

Vice-Chancellor.

---

## BACHELOR OF ARTS (OR SCIENCE) (COMPARTMENTAL)

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Arts (or Science) in this University having been successful at the Compartmental Examination held in the month of \_\_\_\_\_, 19 \_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

Vice-Chancellor.

---

## MASTER OF ARTS (OR SCIENCE)

This is to certify that \_\_\_\_\_ obtained the degree of Master of Arts (or Science) in this University at the Annual Examination in the year 19\_\_\_\_, the special branch in which he was examined having been \_\_\_\_\_ and that he was placed in the \_\_\_\_\_ Class.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

Vice-Chancellor.

---

## BACHELOR OF COMMERCE

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Commerce in this University at the Annual Examination in the year 19\_\_\_\_, and that he was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

Vice-Chancellor.

---

## BACHELOR OF COMMERCE (COMPARTMENTAL)

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Commerce in this University having been successful at the Compartmental Examination held in the month of \_\_\_\_\_, 19 \_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

Vice-Chancellor.

## DOCTOR OF PHILOSOPHY IN ARTS OR SCIENCE (D.PHIL.)

This is to certify that.....  
 obtained the D.Phil. (Arts/Science) degree in.....in this  
 University in the year 19 .

SENATE HOUSE,  
 The , 19 .

Vice-Chancellor.

## DOCTOR OF LITERATURE (D.LITT.)

This is to certify that.....obtained the degree  
 of Doctor of Literature in.....in this University in the  
 year 19 .

SENATE HOUSE,  
 The , 19 .

Vice-Chancellor.

## CERTIFICATE IN APPLIED PSYCHOLOGY

This is to certify that.....duly passed the  
 examination for the Certificate in Applied Psychology held in the month  
 of , 19 , and was placed in the Division.

SENATE HOUSE,  
 The , 19 .

Vice-Chancellor.

## DIPLOMA IN SOCIAL WORK

This is to certify that.....has been granted  
 the Diploma in Social Work (Labour Welfare), he having passed in  
 the Class at the Examination of this University held in  
 the year 19 .

SENATE HOUSE,  
 The , 19 .

Vice-Chancellor.

## DIPLOMA IN SOCIAL WORK (COMPARTMENTAL)

This is to certify that.....has been granted  
 the Diploma in Social Work (Labour Welfare), he having been successful  
 at the Compartmental Examination held in the year 19 .

SENATE HOUSE,  
 The , 19 .

Vice-Chancellor.

## DIPLOMA IN SOAP TECHNOLOGY

This is to certify that.....has been granted  
 the Diploma in Soap Technology, he having passed in Class  
 at the Examination of this University held in the month of , 19 .

SENATE HOUSE,  
 The , 19 .

Vice-Chancellor.

## DOCTOR OF SCIENCE

This is to certify that  
of Doctor of Science in  
the year 19 .

obtained the degree  
in this University in

SENATE HOUSE,  
The , 19 .

Vice-Chancellor.

---

## CERTIFICATE IN TANNING

This is to certify that , duly passed  
the examination for the Certificate in Tanning held in the month of ,  
19 , and that he was placed in the Class.

SENATE HOUSE,  
The , 19 .

Controller of Examinations.

---

## LICENTIATE IN TEACHING

(I)

This is to certify that passed the examination  
for a Licentiate in Teaching at the Annual Examination in the year 19 ,  
and that he was placed in the Class.

SENATE HOUSE,  
The , 19 .

Controller of Examinations.

---

(II)

This is to certify that passed the examination  
for a Licentiate in Teaching in the year 19 .

SENATE HOUSE,  
The , 19 .

Controller of Examinations.

---

## BACHELOR OF TEACHING

(I)

This is to certify that obtained the degree  
of Bachelor of Teaching in this University at the Annual Examination in  
the year 19 , and that he was placed in the Class.

SENATE HOUSE,  
The , 19 .

Vice-Chancellor.

---

(II)

This is to certify that obtained the degree  
of Bachelor of Teaching in this University, having passed the examination  
in the year 19 .

SENATE HOUSE,  
The , 19 .

Vice-Chancellor.

## DIPLOMA IN SPOKEN ENGLISH

This is to certify that \_\_\_\_\_  
 has been granted the Diploma in Spoken English, he having passed in  
 the \_\_\_\_\_ Class at the Annual Examination of this University  
 held in the year 19 \_\_\_\_.

SENATE HOUSE,  
 The \_\_\_\_\_, 19 \_\_\_\_.

Vice-Chancellor.

## ENGLISH TEACHERSHIP CERTIFICATE EXAMINATION

I certify that \_\_\_\_\_ duly passed the  
 Examination for the English Teachership Certificate held in the month of  
 \_\_\_\_\_, 19 \_\_\_\_.

SENATE HOUSE,  
 The \_\_\_\_\_, 19 \_\_\_\_.

Controller of Examinations.

## TEACHERS' TRAINING CERTIFICATE (DISTINCTION)

This is to certify that \_\_\_\_\_ duly passed  
 with Distinction the Examination for the Teachers' Training Certificate  
 (General), held in the month of \_\_\_\_\_, 19 \_\_\_\_.

He received training in the methods of teaching the following subjects :

- (1)
- (2)

SENATE HOUSE,  
 The \_\_\_\_\_, 19 \_\_\_\_.

Controller of Examinations.

## TEACHERS' TRAINING CERTIFICATE (GENERAL)

This is to certify that \_\_\_\_\_ duly passed the  
 Examination for the Teachers' Training Certificate (General), held in the  
 month of \_\_\_\_\_, 19 \_\_\_\_.

He received training in the methods of teaching the following subjects :

- (1)
- (2)

SENATE HOUSE,  
 The \_\_\_\_\_, 19 \_\_\_\_.

Controller of Examinations.

TEACHERS' TRAINING CERTIFICATE (GEOGRAPHY—  
DISTINCTION)

This is to certify that \_\_\_\_\_ duly passed with  
 Distinction the Examination for the Teachers' Training Certificate  
 (Geography), held in the month of \_\_\_\_\_, 19 \_\_\_\_.

SENATE HOUSE,  
 The \_\_\_\_\_, 19 \_\_\_\_.

Controller of Examinations.

## TEACHERS' TRAINING CERTIFICATE (GEOGRAPHY)

This is to certify that \_\_\_\_\_ duly passed the  
Examination for the Teachers' Training Certificate (Geography), held in  
the month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 . *Controller of Examinations.*

## TEACHERS' TRAINING CERTIFICATE (SCIENCE—DISTINCTION)

This is to certify that \_\_\_\_\_ duly passed with  
Distinction the Examination for the Teachers' Training Certificate  
(Science), held in the month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 . *Controller of Examinations.*

## TEACHERS' TRAINING CERTIFICATE (SCIENCE)

This is to certify that \_\_\_\_\_ duly passed the  
Examination for the Teachers' Training Certificate (Science), held in  
the month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 . *Controller of Examinations.*

TEACHERS' TRAINING CERTIFICATE (ART APPRECIATION—  
DISTINCTION)

This is to certify that \_\_\_\_\_ duly passed with  
Distinction the Examination for the Teachers' Training Certificate  
(Art Appreciation) held in the month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 . *Controller of Examinations.*

## TEACHERS' TRAINING CERTIFICATE (ART APPRECIATION)

This is to certify that \_\_\_\_\_ duly passed the  
Examination for the Teachers' Training Certificate (Art Appreciation) held  
in the month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 . *Controller of Examinations.*

## DIPLOMA IN LIBRARIANSHIP (DISTINCTION)

This is to certify that \_\_\_\_\_ has been granted  
the Diploma in Librarianship, he having passed with Distinction at the  
Annual Examination of this University held in the year 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 . *Vice-Chancellor.*

## DIPLOMA IN LIBRARIANSHIP (PASS)

This is to certify that \_\_\_\_\_ has been granted the Diploma in Librarianship, he having passed at the Annual Examination of this University held in the year 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Vice-Chancellor.

## PRELIMINARY EXAMINATION IN LAW

This is to certify that \_\_\_\_\_ duly passed the Preliminary Examination in Law, held in the month of \_\_\_\_\_, 19 , and that he was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

## INTERMEDIATE EXAMINATION - IN LAW

This is to certify that \_\_\_\_\_ duly passed the Intermediate Examination in Law, held in the month of \_\_\_\_\_, 19 , and that he was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

## BACHELOR OF LAWS

*Diploma*

This is to certify that \_\_\_\_\_ obtained the Degree of Bachelor of Laws in this University at the Examination held in the month of \_\_\_\_\_, 19 , and that he was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Vice-Chancellor.

## MASTER OF LAWS

This is to certify that \_\_\_\_\_ obtained the Degree of Master of Laws in this University at the Annual Examination in the year 19 , and that he was placed in the \_\_\_\_\_ Class.

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Vice-Chancellor.

## DOCTOR OF LAWS

This is to certify that \_\_\_\_\_ obtained the Degree of Doctor of Laws in this University in the year 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Vice-Chancellor.



## PRELIMINARY SCIENTIFIC M.B. EXAMINATION

This is to certify that \_\_\_\_\_ duly passed the  
Preliminary Scientific Examination for the degree of M.B., held in the  
month of \_\_\_\_\_, 19 \_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

*Controller of Examinations.*

---

## FIRST M.B.B.S. EXAMINATION (PASS)

This is to certify that \_\_\_\_\_ duly passed the  
First Examination for the degree of M.B.B.S. held in the month  
of \_\_\_\_\_, 19 \_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

*Controller of Examinations.*

---

## SECOND M.B.B.S. EXAMINATION

This is to certify that \_\_\_\_\_ duly passed the  
Second Examination for the degree of M.B.B.S. held in the month  
of \_\_\_\_\_, 19 \_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

*Controller of Examinations.*

---

## THIRD M.B.B.S. EXAMINATION

This is to certify that \_\_\_\_\_ duly passed the  
Third Examination for the degree of M.B.B.S. held in the month  
of \_\_\_\_\_, 19 \_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

*Controller of Examinations.*

---

## FIRST, SECOND OR THIRD M.B.B.S. EXAMINATION (HONOURS)

This is to certify that \_\_\_\_\_ duly passed the  
First/Second/Third Examination for the degree of M.B.B.S. held in the  
month of \_\_\_\_\_, 19 \_\_\_\_.  
He obtained Honours in \_\_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

*Controller of Examinations.*

---

## FINAL M.B.B.S. EXAMINATION (PASS)

This is to certify that \_\_\_\_\_, having completed the curriculum of study and passed in \_\_\_\_\_, the examinations required by the Regulations of this University (sanctioned by the Governor-General of India in Council in accordance with the Act of Incorporation and the Indian Universities Act, 1904) for the degree of Bachelor of Medicine and Surgery, which has been duly conferred upon him, is hereby declared competent and authorised to practise Medicine, Surgery and Midwifery.

Dated at Calcutta, this \_\_\_\_\_ day of \_\_\_\_\_, 19 \_\_\_\_.

*President of the Board of Examiners.*

*Vice-Chancellor,*

*Controller of Examinations.*

(Signature of the Graduate.)

---

## FINAL M.B.B.S. EXAMINATION (HONOURS)

This is to certify that \_\_\_\_\_, having completed the curriculum of study and passed in \_\_\_\_\_, the examinations required by the Regulations of this University (sanctioned by the Governor-General of India in Council in accordance with the Act of Incorporation and the Indian Universities Act, 1904) for the degree of Bachelor of Medicine and Surgery, which has been duly conferred upon him, is hereby declared competent and authorised to practise Medicine, Surgery and Midwifery.

He obtained Honours in \_\_\_\_\_

Dated at Calcutta, this \_\_\_\_\_ day of \_\_\_\_\_, 19 \_\_\_\_.

*President of the Board of Examiners.*

*Vice-Chancellor,*

*Controller of Examinations.*

(Signature of the Graduate.)

## M.B. EXAMINATION

Form of Application together with a certificate prescribed under Chapter XLVI of the Regulations (to be used after attending the course of six months' practical clinical instruction).

To

The Controller of Examinations,

University of Calcutta.

Sir,

I beg to apply for admission to the M.B. Degree.

I have attended the course of six months' practical clinical instruction in \_\_\_\_\_ hospital, as contemplated in Chapter XLVI, after having passed the Final M.B. Examination in Part I and Part II, held in the month of \_\_\_\_\_, 19 \_\_\_\_ (Roll \_\_\_\_\_).

I am,

Sir,

Yours obediently,

Date .....

Address .....

## CERTIFICATE

This is to certify that

(To be signed by the  
Head of the Institu-  
tion or Hospital where  
the candidate received  
the practical training).

after having suc-  
cessfully passed the M.B.B.S. Examination has  
completed the prescribed course of practical clinical  
instruction (including special diseases) and has ful-  
filled the conditions laid down in Chapter XLVI of  
the Regulations.

*Head of the Institution.*

Date .. .. .

*Name of the Institution.*

DOCTOR OR MASTER IN THE FACULTY OF MEDICINE  
*Diploma*

We, the Vice-Chancellor, the Dean of the Faculty of Medicine, and the  
Controller of Examinations of the University of Calcutta, do hereby make  
known that, in the year 19 , has been  
admitted to the degree of Doctor of Medicine/Master of Surgery/Master  
of Obstetrics, he having been first certified by duly appointed Examiners  
to be qualified to receive the same.

SENATE HOUSE,  
The , 19 .

*Vice-Chancellor.*

*Dean of the Faculty of Medicine.*

*Controller of Examinations.*

DIPLOMA IN OPHTHALMIC MEDICINE AND SURGERY

This is to certify that has been granted  
the Diploma in Ophthalmic Medicine and Surgery, he having passed at  
the Annual Examination of this University held in the year 19 .

SENATE HOUSE,  
The , 19 .

*Vice-Chancellor.*

DIPLOMA IN GYNAECOLOGY AND OBSTETRICS

This is to certify that has been granted  
the Diploma in Gynaecology and Obstetrics, he having passed at the  
Annual Examination of this University held in the year 19 .

SENATE HOUSE,  
The , 19 .

*Vice-Chancellor.*

DIPLOMA IN MATERNITY AND CHILD WELFARE

This is to certify that has been granted  
the Diploma in Maternity and Child Welfare, she having passed at the  
Annual Examination of this University held in the year 19 .

SENATE HOUSE,  
The , 19 .

*Vice-Chancellor.*

## DIPLOMA IN PUBLIC HEALTH

We, the Vice-Chancellor, the Dean of the Faculty of Medicine, and the Controller of Examinations of the University of Calcutta, do hereby make known that, in the year 19 . . . has been granted the Diploma of Public Health, he having been first certified by duly appointed Examiners to be qualified to receive the same.

SENATE HOUSE,  
The . . . , 19 . . . Vice-Chancellor.  
Dean of the Faculty of Medicine.  
Controller of Examinations.

---

DIPLOMA FOR THE DEGREE OF DOCTOR OF SCIENCE  
(PUBLIC HEALTH)

This is to certify that . . . obtained the degree  
of Doctor of Science (Public Health), in . . . in  
this University at the Annual Examination in the year 19 . . .

SENATE HOUSE,  
The . . . , 19 . . . Vice-Chancellor.

---

BACHELOR OF ENGINEERING EXAMINATION  
PART I

I certify that . . . duly passed the  
Bachelor of Engineering Examination Part I held in the month  
of . . . , 19 . . .

SENATE HOUSE,  
The . . . , 19 . . . Controller of Examinations.

---

BACHELOR OF ENGINEERING EXAMINATION  
PART II  
Diploma

This is to certify that . . . obtained the degree  
of Bachelor of Engineering in this University at the Annual Examination  
in the year 19 . . . , the special branch in which he was examined having  
been . . . and that he was placed in the . . . Class.

SENATE HOUSE,  
The . . . , 19 . . . Vice-Chancellor.

---

## DOCTOR OF SCIENCE (ENGINEERING)

This is to certify that . . . obtained the degree  
of Doctor of Science (Engineering) in this University at the Annual  
Examination in the year 19 . . .

SENATE HOUSE,  
The . . . , 19 . . . Vice-Chancellor.

---

## JUNIOR MILITARY CERTIFICATE EXAMINATION

This is to certify that \_\_\_\_\_ duly  
passed/passed with Distinction the Junior Military Certificate Examination  
held in the month of \_\_\_\_\_, 19 \_\_\_\_\_

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_\_ Controller of Examinations.

## SENIOR MILITARY CERTIFICATE EXAMINATION

This is to certify that \_\_\_\_\_ duly  
passed/passed with Distinction the Senior Military Certificate Examination  
held in the month of \_\_\_\_\_, 19 \_\_\_\_\_

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_\_ Controller of Examinations.

## DIPLOMA IN DIETETICS

This is to certify that.....has  
been granted the Diploma in Dietetics, he having passed at the Annual  
Examination of this University in the year 19 \_\_\_\_\_

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_\_ Vice-Chancellor.

MASTER OF ENGINEERING (*Public Health*)

This is to certify that.....  
obtained the Degree of Master of Engineering (*Public Health*), in this  
University at the Annual Examination in the year 19 \_\_\_\_\_, and that he was  
placed in the First Class.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_\_ Vice-Chancellor.

MASTER OF ENGINEERING (*Public Health*)

This is to certify that.....  
obtained the Degree of Master of Engineering (*Public Health*), he having  
passed at the Annual Examination in the year 19 \_\_\_\_\_

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_\_ Vice-Chancellor.

## BACHELOR OF ENGINEERING EXAMINATION, PART I,

I certify that.....  
duly passed the Bachelor of Engineering Examination, Part I, held in the  
month of....., 19 \_\_\_\_\_

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_\_ Controller of Examinations.

## DIPLOMA IN DOMESTIC SCIENCE TRAINING

This is to certify that.....  
duly passed with Distinction the Examination for the Diploma in Domestic  
Science Training held in the month of....., 19 .

SENATE HOUSE,  
The . , 19 .

*Controller of Examinations (Offg.).*

---

## DIPLOMA IN DOMESTIC SCIENCE TRAINING

This is to certify that.....  
duly passed the Examination for the Diploma in Domestic Science Training  
held in the month of....., 19 .

SENATE HOUSE,  
The . , 19 .

*Controller of Examinations (Offg.).*

---

**FORM OF ADMISSION REGISTER TO BE MAINTAINED BY AFFILIATED COLLEGES UNDER SECTION 4,  
CHAPTER XX OF THE REGULATIONS**

1	2	3	4	5	6	7	8		
Serial No.	(a) Name of the student, (b) Home address and (c) Local address.	Age according to Matriculation Certificate.	Father's name, occupation and address. If father is not alive, the same particulars in respect of the other guardian with relationship.	(a) Race, (b) Religion, (c) Caste of the student, (d) Married or unmarried.	Local guardian (Name, occupation, address and relationship).	School or College last attended (in the case of a student migrating from a different University or Board, the name of the University or the Board should also be noted).	University Examinations passed or taken with Roll and Number and Division in each case.		
9	Number and date of Transfer Certificate, if any, with the name of the institution concerned.	Number and date of University permission letter (in case of a student admitted on migration).	Date of admission.	Course and Class to which admitted.	Combination taken.	University Regn. No. with year.	Roll and Initial of the Principal. The College records.		
		10	11	12	13	14	15	16	17
						</			

**FORM OF TRANSFER CERTIFICATE PRESCRIBED BY THE  
SYNDICATE UNDER SECTION 22, CHAPTER XXIII  
OF THE REGULATIONS**

No..

Certified that....., son of....., an inhabitant of....., has been a student in the.....year class of the.....College from.....to....., 19 . His conduct has been.....  
I know nothing against his character. (1)  
All sums due by him to the College have been paid, including College fees up to....., 19 .  
His (2).....scholarship, of Rupees.....per mensem has been drawn and paid to him in this College up to....., 19 .  
His attendance in each course of lectures (3) is given below:—

Subject							
Number of Lectures							
Delivered							
Attended							

(Remarks.—Here entries may be made under Sections 24, 25, 26 of Chapter XXIII of the Regulations.)

Principal.

The....., 19 .

.....College.

**TRANSFER CERTIFICATE ISSUED UNDER SECTION 26A,  
CHAPTER XXIII OF THE REGULATIONS**

No.....

Certified that....., son of....., an inhabitant of....., has been a student in the.....year class of the.....College from.....to....., 19 .

(1) If anything is known against the character of the student this should be suitably altered.

(2) To be filled up in the case of Government scholars only.

(3) See Section 4, Chapter XXVI of the Regulations.



His University Registration Number is.....of.....  
 All sums due from him to the college have been paid, including college fees up to....., 19 .

His (1).....scholarship, of Rupees.....per mensem has been drawn and paid to him in this college up to....., 19 .

His attendance in each course of lectures (2) is given below :—

Subject							
Number of Lectures							
Delivered							
Attended							

*Remarks.*—Here entries may be made under Sections 24, 25, 26 of Chapter XXIII of the Regulations.

.....

*Principal.*

*The*....., 19 .

.....*College.*

### FORM OF NOMINATION PAPER

*(Prescribed by the Syndicate under Section 4, Chapter XII of the Regulations)*

I, ..... do hereby nominate .....for election by the Faculty of.....as an Ordinary Fellow of the Calcutta University, subject to the approval of His Excellency the Chancellor.

The following is a brief statement of the special qualifications of my nominee :—

*Signature*.....

*The*....., 19 .

*Member of the Faculty of*.....

(1) To be filled up in the case of Government scholars only.

(2) See Section 4, Chapter XXVI of the Regulations.

# REGISTER OF GRADUATES

(Prescribed by the Syndicate under Section 1, Chapter XIV of the Regulations)

Registration number.	
Date of Registration.	
Date of annual subscription.	
Name.	
Initial Fee.	
Annual subscription.	
Year for which annual subscription is paid.	
Compounding Fee.	
Address.	
Present occupation.	
Degree or Degrees taken with dates.	
College from which Degree was taken.	
REMARKS	

FORM OF ANNUAL RETURN TO BE SUBMITTED BY AFFILIATED  
COLLEGES ON OR BEFORE THE 1ST OF AUGUST

*(Prescribed under Section 7, Chapter XX of the Regulations)*

1. Names of the members of the Governing Body.
2. Names and qualifications of the teaching staff, and the subjects and classes taught by each.
3. The subjects taught in each class.
4. The number of students in each class and the number of students who have taken the different optional subjects.
5. The number of students who reside—
  - (a) with parents or guardians;
  - (b) in the collegiate hostel, if any;
  - (c) in non-collegiate hostels;
  - (d) in attached messes;
  - (e) in unattached messes;
  - (f) in private lodgings.
6. Income during the preceding twelve months—
  - (a) from fees;
  - (b) from fines;
  - (c) from Govt. Grant, if any;
  - (d) from University Grant, if any;
  - (e) from endowments, if any;
  - (f) from donations and subscriptions, if any;
  - (g) miscellaneous.
7. Expenditure during the preceding twelve months—
  - (a) salaries of the Staff;
  - (b) buildings;
  - (c) library;
  - (d) laboratory;
  - (e) miscellaneous.
8. Rate of fees charged—
9. Number of students whose fees are remitted—
  - (a) in whole;
  - (b) in part.
10. Number of students in receipt of Scholarships—
  - (a) from Government;
  - (b) from Public Funds;
  - (c) from University Funds;
  - (d) from Endowments;
  - (e) from College Funds;
  - (f) from private donors.

The....., 19 .

*Signature of the Secretary to the  
Governing Body.*

# APPENDIX C

## ASTRONOMY

### B.A. AND B.SC. STANDARD

*Instruments for Practical teaching in Astronomy (Honours Course)*

Transit Theodolite.  
Sidereal Chronometer.  
Sextant.

## PHYSICS

### A.—INTERMEDIATE STANDARD

(a) *List of Apparatus for Practical Class of 20 Students*

Half-metre scale	...	...	...	...	6
Metre scale	...	...	...	...	6
Steel scales (80 cms.)	...	...	...	...	3
Diagonal scale	...	...	...	...	6
Slide Callipers	...	...	...	...	6
Spirit Levels	...	...	...	...	6
Plumb lines	...	...	...	...	3
Vernier (Linear)	...	...	...	...	3
Vernier (Circular)	...	...	...	...	3
Glass scales and plates	...	...	...	...	6
Micrometer Screw Gauge	...	...	...	...	6
Students' Spherometer	...	...	...	...	6
Protractors	...	...	...	...	6
Stop cocks	...	...	...	...	1
Tall Glass jars	...	...	...	...	6
Nicholson's Hydrometer	...	...	...	...	6
Hare's Apparatus	...	...	...	...	3
Boyle's Law Apparatus	...	...	...	...	2
Beam Compass	...	...	...	...	2
Drawing Boards	...	...	...	...	6
Fortin's Barometer	...	...	...	...	1
Inclined Plane	...	...	...	...	1
Friction Apparatus	...	...	...	...	1
Balance	...	...	...	...	4
Weight Boxes	...	...	...	...	6
Wooden Bridges	...	...	...	...	6
Precision Balance	...	...	...	...	1
Pendulum and Stand	...	...	...	...	6
Basins	...	...	...	...	6
Beakers	...	...	...	...	2 doz.
Watch glasses	...	...	...	...	1 doz.
Big Glass Funnels	...	...	...	...	6
Graduated Cylinders	...	...	...	...	4
Drawing Pins	...	...	...	...	1 gross.
Thermometer	...	...	...	...	12
Hypsometer	...	...	...	...	8
Calorimeter	...	...	...	...	6
Steam Jacket	...	...	...	...	3
Boiler	...	...	...	...	3

Optical Bench	...	...	...	4
Fourway candle holder	...	...	...	4
Concave mirror	...	...	...	6
Ground glass screen	...	...	...	6
Convex lens	...	...	...	6
Small plane mirror mounted on wooden block	...	...	...	6
Rectangular glass slab	...	...	...	6
Ordinary glass prism	...	...	...	6
Bunsen's Photometer	...	...	...	2
Tuning Fork	...	...	...	3
Barometer tubes	...	...	...	6
Glass tubes	...	...	...	10 lbs.
Glass rod	...	...	...	3
Ebonite rod	...	...	...	3
Electroscope	...	...	...	3
Electrophorus	...	...	...	3
Insulated sphere	...	...	...	3
Rubbers	...	...	...	3
Bunsen's cell	...	...	...	2
Daniell's cell	...	...	...	2
Leclanché's cell	...	...	...	6
Storage cell	...	...	...	2
				(where electric supply is available)
D'Arsonval Galvanometer	...	...	...	1
Tangent Galvanometer	...	...	...	1
Astatic Galvanometer	...	...	...	1
Ammeter	...	...	...	1
Voltmeter	...	...	...	1
Post Office Box	...	...	...	2
Metre Bridge	...	...	...	3
Rheostat	...	...	...	3
Resistance coils	...	...	...	6
Bar Magnet	...	...	...	6
Small Compass needle	...	...	...	6
Bunsen Burner	...	...	...	6
Tripod stand	...	...	...	6
Retort Stands and Clamps	...	...	...	6
Fish-tail Burner	...	...	...	1
Wire Gauze 6" x 6"	...	...	...	12
Lens Holders	...	...	...	6
Corkborers	...	...	...	1 set
Wooden stands with clamp	...	...	...	3

## (b) List of Apparatus for Lecture Purpose

## Miscellaneous—

Strong adjustable table.  
 Adjustable stands.  
 Bunsen's Universal holder.  
 Wooden holders.  
 Set of wooden cubes.  
 Set of wooden cylinders.  
 Set of wooden discs.  
 Bunsen Burners.  
 Spirit Lamps.  
 Glass Flasks.

Glass burettes.  
 Glass funnels.  
 Glass beakers.  
 Cylindrical glass measures.  
 Glass tubing.  
 India rubber tubing.  
 Wire gauze.

#### General Physics—

Archimedes' apparatus.  
 Specific gravity bottle.  
 U-shaped communicating vessel.  
 Hare's apparatus.  
 Aneroid barometer.  
 Spring balance.  
 Inclined plane.  
 Parallelogram of forces apparatus.  
 Hydrostatic balance.  
 Pulleys.  
 Apparatus for demonstrating the Laws of Levers.  
 Model of Hydraulic Press.  
 Lift pump.  
 Force pump.  
 Model of Fire Engine.  
 Fire Syringe.  
 Hydrometers.  
 Transmission of Fluid Pressure Apparatus.  
 Barker's mill.  
 Communicating vessel apparatus.  
 Pascal's apparatus.  
 Cartesian figures.  
 Apparatus for showing upward pressure of water.  
 Baroscope.  
 Siphon.  
 Cylinder for showing the fall of bodies in a vacuum.  
 Rubber tube.  
 Hero's fountain.  
 Vacuum pump with receiver.  
 Bell-jar.  
 Vacuum gauge.  
 Flask for showing weight of air.  
 Magdeburg hemispheres.  
 Tantalus Cup.  
 Foot bellows.

#### Heat—

Thermometers.  
 Maximum and Minimum Thermometers.  
 Dry and Wet Bulb Thermometers.  
 Daniell's Hygrometer.  
 Regnault's Hygrometer with aspirator.  
 Pyrometer.  
 Ball and Ring apparatus.  
 Boyle's Law Apparatus with air-bulb attachment.  
 Bar breaking apparatus.  
 Compound brass and iron rod.  
 Pullinger's apparatus.

Apparatus for determining the boiling point of water.  
 Conducting power apparatus.  
 Ingenhausz's apparatus.  
 Glazebrooke's apparatus for convection-current.  
 Model Thermometer for expansion of liquids.  
 Weight Thermometer.  
 Dilatometer.  
 Pyknometer.  
 Expansion of liquid apparatus.  
 Hope's apparatus.  
 Vapour pressure apparatus.  
 Davy's Safety Lamp.  
 Ritchie's apparatus for absorbing and emissive powers.  
 Differential air thermometers.  
 Leslie's cube.  
 Whirling table for boiling liquids by friction.  
 Model of Steam Engine.  
 Model of Internal Combustion Engine.

#### Light—

Heliostat with attachment of adjustable slit and diaphragm.  
 Travelling Microscope.  
 Telescope.  
 Rumford's Photometer.  
 Grease-spot Photometer.  
 Convex and Concave Mirrors.  
 Adjustable slit.  
 Angular Mirrors.  
 Parallel Mirrors.  
 Convex and Concave Lenses, mounted and unmounted.  
 Glass troughs.  
 Set of 6 Lecture lenses.  
 Set of Prisms.  
 Hartley's optical disc with following attachments :—  
 (1) Plane Mirror.  
 (2) Concave-Convex Mirror.  
 (3) Double Convex lens.  
 (4) Prism 45 and 90.  
 (5) Prism 45 and 60.  
 (6) Double Concave lens.  
 Apparatus for proving laws of reflection.  
 Apparatus for showing refraction of rays in liquids.  
 Newton's colour disc.  
 Spectrometer.  
 Projection apparatus.  
 Model of the Eye.  
 Camera.  
 Prismatic Binocular.  
 Phosphorescent substances.  
 Fluorescent liquids

#### Sound—

Slotted weights.  
 Transverse Wave Machine.  
 Bell-experiment apparatus.  
 Spring balance monochord.  
 Resonance apparatus.

## Tuning Forks.

Set of four Organ pipes.

Organ pipe with centre stop.

Large Organ pipe for showing nodes and antinodes.

Organ pipe with movable piston.

Rotating mirror.

Manometric flame apparatus.

Square Chladni's Plates.

Circular Chladni's Plates.

Savart's toothed wheel.

Cagniard de la Tour's Siren.

Revolving table.

Bellows with four Valves.

Model of the Ear.

Phonograph.

## Frictional Electricity—

Rods of glass, ebonite, sealing wax

Rod—half glass, half brass

Faraday's ice-pails.

Roll of tin-foil on glass tube

Wimshurst machine

Voss machine.

Electric whirl.

Insulating stool.

Electrical chimes.

Sliding condenser.

Spherical conductor.

Cylindrical conductor.

Conical conductor.

Two equal brass spheres for showing induced charges.

Hollow brass sphere with a hole at the top

Biot's apparatus.

Gold-leaf electroscope.

Pith ball pendulum

Rubbers

Flannel.

Silk.

Catskin.

Proof plane.

Electrophorous.

Leyden jar.

Detachable Leyden jar.

Discharger.

## Magnetism—

Lodestone.

Large Bar magnets.

Horse shoe magnet

Compass needle.

Magnetic needles

Dip circle.

Prismatic compass.

Electromagnet.

Mariner's compass.

Deflection Magnetometer.

Steel Watch Spring and Knitting Needles.

Iron Filings.



### Voltaic Electricity—

Oersted's apparatus.  
 Lecture apparatus for showing—  
     (a) rotation of magnet round current.  
     (b) rotation of current round magnet.  
     (c) rotation of current round current.  
 Lecture galvanometer.  
 Barlow's wheel.  
 Roget's vibrating spiral.  
 Floating battery.  
 Zinc and copper plates.  
 Bichromate cell.  
 Bunsen's cell.  
 Daniell's cell.  
 Leclanché's cell.  
 Dry cell.  
 Grove cell.  
 Storage cell.  
 Voltaic pile.  
 Meter bridge.  
 Voltmeter.  
 Ammeter.  
 Galvanometers—Astatic, D'Arsonval type, Tangent.  
 Resistance boxes.  
 Electric arc.  
 Ampere's apparatus.  
 Demonstration dynamo.  
 Demonstration motor.  
 Electric bell.  
 Morse transmitter.  
 Morse sounder.  
 Telephone receiver.  
 Electromagnet.  
 Microphone.  
 Pohl's commutator.  
 Apparatus for illustrating induced currents.  
 Induction Coil.  
 Copper Voltmeter.  
 Water Voltmeter.  
 Silver Voltmeter.  
 Joule's Calorimeter.  
 Thermopile.  
 Geissler's tubes.  
 Crook's vacuum tubes for demonstrating phenomena of discharge at different degrees of exhaustion.  
 Apparatus for showing deflection of cathode rays by magnetic field.  
 Shadow tube.  
 Apparatus for showing mechanical action of cathode rays.

### B.—B.A. OR B.Sc. STANDARD

(a) *List of Apparatus for Practical Class of not more than 15 Students  
(in addition to that for Intermediate Course)*

Workshop tools	...	...	...	...	4
Sensitive balance	...	...	...	...	1
Precision balance	...	...	...	...	1

Weight boxes	...	...	...	6
Spherometers	...	...	...	3
Screw gauges	...	...	...	3
Callipers	...	...	...	3
Specific gravity bottles	...	...	...	6
Young's modulus apparatus (2 forms)	...	...	...	2
Pendulums	...	...	...	3
Linear expansion of rods and tubes—travelling microscopes and spherometer	...	...	...	2
Constant pressure air thermometer	...	...	...	1
Constant volume air thermometer	...	...	...	1
Calorimeters	...	...	...	6
Regnault's hygrometer	...	...	...	1
Wet and dry bulb hygrometer	...	...	...	1
Tuning forks (large size)	...	...	...	6
Apparatus for determining the velocity of sound by resonance	...	...	...	1
Sonometer	...	...	...	2
Bunsen Burners	...	...	...	6
Optical bench and accessories	...	...	...	2
Concave lenses of different focal lengths	...	...	...	6
Convex lenses of different focal lengths	...	...	...	6
Concave mirrors of different focal lengths	...	...	...	3
Convex mirrors of different focal lengths	...	...	...	3
Spectrometer	...	...	...	1
Spectroscope	...	...	...	1
Travelling microscope	...	...	...	1
Apparatus for determining $\mu$ by total reflection	...	...	...	1
Deflection magnetometer	...	...	...	2
Apparatus for determining the time period of vibration of a magnet	...	...	...	2
Dip circle	...	...	...	1
Ammeter	...	...	...	2
Milliammeter	...	...	...	1
Voltmeter	...	...	...	2
Millivoltmeter	...	...	...	1
D'Arsonval Galvanometer (suspended and pointer types)	...	...	...	3
Tangent galvanometer (Helmholtz type)	...	...	...	1
Post Office Box	...	...	...	3
Potentiometer	...	...	...	2
Metre bridge	...	...	...	3
Resistance coils and rheostats	...	...	...	12
Storage cells	...	...	...	3
Leclanché's cells	...	...	...	6

*Additional Apparatus for Honours Course*

Precision balance	...	...	...	2
Precision weight boxes with riders	...	...	...	2
Travelling microscopes	...	...	...	3
Apparatus for determining Young's modulus by bending	...	...	...	1
Surface tension apparatus	...	...	...	1
Regnault's Calorimeter	...	...	...	1
Precision Thermometers reading to a degree Centigrade	...	...	...	6
Dumas' apparatus for vapour density	...	...	...	1
Victor Meyer's Do.	...	...	...	2
Clement and Desormes' apparatus	...	...	...	1
Searle's conductivity apparatus	...	...	...	1
Kundt's tube	...	...	...	1
Precision spectrometer	...	...	...	1

Optical Bench with accessories for bi-prism, double mirror	...	1
Biprism	...	1
Nodal point apparatus	...	1
Diffraction gratings (1,000, 2,000 and 6,000 lines per cm.)	...	8
Hydrogen, Neon, Helium tubes	...	8
Small Induction coil	...	1
Single and double slits	...	1
Calendar and Barnes' calorimeter	...	1
D'Arsonval Galvanometer (sensitivity 10)	...	8
Platinum Resistance Thermometer	...	1
Standard Resistance (10, 1, .1)	...	1
Standard cell	...	1
Accurate Potentiometer	...	1

(b) *List of Apparatus for Lecture Purpose*

Miscellaneous—

Large projection lantern.  
 Apparatus for projection of horizontal objects.  
 Large projection screen.  
 Bunsen's Universal holder.  
 Water Bath.  
 Specific Gravity bottles.  
 Aneroid Barometer.  
 Rotary Air Pump

General Ideas—

Apparatus for the production of stationary waves.  
 Apparatus for showing interference of waves.  
 Soap film frames.  
 Capillary tubes with stand.  
 Capillary plates.  
 Cohesion plates for suspension from balance.

Heat—

Dregne's metal thermometer.  
 Joule's apparatus for showing contraction of a stretched India rubber tube by heat.  
 Right-angled bent glass tube for showing the circulation of water.  
 Davy's Safety Lamp.  
 Apparatus for showing the difference in the expansibility of various liquids.  
 Gay-Lussac's apparatus for proving Dalton's Law.  
 Apparatus to show boiling at low pressure.  
 Wollaston's cryophorus.  
 Pulse glass.  
 Arrangement for melting ice-block by means of a loaded wire.  
 Melloni's apparatus for illustrating radiation, absorption and reflection of heat.  
 Model of Otto-cycle.

Light—

Apparatus for showing total reflection.  
 Right-angled crown glass prism.  
 Pair of achromatic prisms on stand.

Prism with adjustable angle for liquids on stand,  
 Three small direct vision spectroscopes.  
 Phosphorescent substances.  
 Model of the eye  
 Stereoscope and pictures.  
 Absorption trough.  
 Two prismatic troughs.  
 Chart of various spectra.  
 Fluorescent liquids.  
 Cubes of Uranium and Fluorspar.  
 Lantern slides illustrating various optical effects.  
 Model of sextant.  
 Small telescope.  
 Fresnel's mirrors.  
 Fresnel's bi-prism.  
 Diaphragm with various apertures for showing diffraction.  
 Norrenberg's polariscope.  
 Set of apparatus for use with the same.  
 Tourmaline tongs.  
 Rhomb of Iceland spar.  
 Newton's colour rings.  
 Nicol's prisms.  
 Polarimeter.  
 Wollaston's double image prism.

#### Sound—

Burner for sensitive flame.  
 Glass bell on stand for showing node  
 Chladni's plate.  
 Trevelyan rocker.  
 Chemical harmonicon.  
 Manometric jet.  
 Revolving mirror on stand  
 Additional organ pipes.  
 Pipe with free reed.  
 Pipe with striking reed  
 Set of resonators.  
 Interference tube.  
 Airy's double pendulum.  
 Chronographic tuning fork.  
 Phonograph.  
 Telephone receiver.  
 Microphone.

#### Electricity and Magnetism—

Condenser.  
 Additional illustrative apparatus in frictional electricity.  
 Voltaic pile.  
 Dry cells.  
 Storage cells.  
 Lecture-room ammeter.  
 Lecture-room Voltmeter.  
 Simple galvanoplastic apparatus.  
 Large electromagnet.  
 Morse telegraph.  
 Barlow's wheel.  
 Lecture apparatus for showing rotation of magnets and currents  
 under electromagnetic forces.

Arago's apparatus for showing induced currents.  
 Model of a Gramme ring.  
 Small dynamo and hand wheel.  
 Small model motor.  
 Induction coil giving 3" or 4" spark.  
 Vacuum tubes.  
 Crook's tubes.  
 Seebeck's thermo-electric apparatus.  
 Thermo-electric pile.  
 Photo-electric cell.  
 Thermionic valve  
 Electrometer.  
 Earth inductor.  
 Model of a transformer.  
 Rotary converter.

### C.—M.A. OR M.Sc. STANDARD

For this standard there must be a complete collection of apparatus for Advanced Practical work.

(a) *Optic*.—The equipment of the optical room shall include instruments for accurate measurement such as spectrosopes, spectrometers, polarimeters, optical bench, refractometers, reading microscopes, etc.—

(b) *Electricity and Magnetism*.—The electrical room shall be fitted with sensitive mirror galvanometers and there shall be an adequate supply of instruments for electrical and magnetic measurement, i.e., resistance boxes, galvanometers, electrometers, magnetometers, standard resistances, standard capacities, standard cells, etc., besides auxiliary apparatus such as an induction coil with 8"-10" spark, a powerful electromagnet, electric motors, etc.

An accumulator battery shall form part of the electric installation, if any.

(c) *Heat*.—Additional apparatus for accurate work in calorimetry, thermometry, conduction, radiation, expansion, etc.

(d) *General Physics and Sound*.—Additional apparatus for accurate work in elasticity, vapour density, capillarity, fluid friction, etc., and sound.

(e) *Workshop Equipment, including Lathe*.

## PHYSIOLOGY

### A.—INTERMEDIATE STANDARD

(a) *List of Apparatus, etc., for Practical Class of 24 Students*

Microscopes, one doz.  
 Dissecting instruments and razors, etc.  
 Gas burners (Bunsen), 1½ doz.  
 Test tube stands, 1½ doz.  
 Retort stands with rings, etc., 1 doz.  
 Glass bottles, etc.  
 Thermometers, 1 doz.  
 Test tubes and glass beakers.  
 Glass flasks and measures.  
 Glass tubing and rods and funnels.

Procelain crucibles, etc.  
 One balance.  
 One Microtone (ice-freezing).  
 One Haemocytometer (Zeiss).  
 One Haemoglobinometer (Gowar's)

(b) *List of Apparatus and Appliances for Lecture Purpose*

One Human Skeleton.  
 Set of 50 diagrams (3 ft. by 2 ft.).  
 Ordinary apparatus and appliances for illustrating lectures of  
 Chemical Physiology.  
 One simple recording drum (with clock-work).  
 One time marker.  
 One muscle-lever myograph.  
 Two simple stands for ditto.  
 One induction coil.  
 Two electric keys.  
 One commutator.  
 Four bichromate cells.  
 Insulated wire, 1 lb. (22 B. W. G.).  
 Muscle-weights, 1 set.  
 One Sphygmograph.  
 One Marey's tambour.  
 One Marey's cardiograph.  
 One Model of eye (dissectible).  
 One Phacoscope.  
 One Model of ear (dissectible).  
 One Spectroscope (straight vision).

B.—B.A. OR B.Sc. STANDARD

(a) *List of Apparatus, etc., for Practical Class of 12 Students*

*Additional requirements :—*

One Rocking Microtome.  
 Micrometers (eye-piece and stage).  
 Three Doremus Ureometers.  
 One Chemical Balance.  
 One Embedding bath (Hearson's).  
 Three Tetanus springs (graduated).  
 One Hypodermic syringe.  
 One Mercury Pump for gas analysis.  
 Two Desiccators.  
 Three Soxhlet apparatus with Liebig condenser.  
 One Centrifugal machine.  
 One Water bath (copper).  
 One Air Pump.

The following set of apparatus is required for every couple of students :—

One Recording drum.  
 One Simple muscle-lever.  
 One Crank myograph.  
 One Simple stand  
 One Du Bois Reymond's induction coil.

Two Electric keys.  
 One Pohl's commutator.  
 One Simple rheocord.  
 Two pairs of platinum electrodes.  
 One Bichromate cell.  
 One set of Muscle weights.  
 One Time Marker.  
 One Spectroscope (straight vision).  
 One Esbch's albuminometer.  
 One Urinometer.

(b) *List of Apparatus, etc., for Lecture Purpose*

*Additional requirements :—*

One Kronecker's perfusion cannula.  
 One Rabbit holder.  
 One Adjustable simple stand.  
 One Tuning fork (on stand) making 10 D. V. per second.  
 One Tetanus spring (graduated).  
 One Metronome.  
 One Deprez chronograph.  
 Two pairs of non-polarisable electrodes.  
 One pair of muscle forceps.  
 One Ophthalmoscope.  
 Two Electrodes (shielded) for deep nerves.  
 One Hill and Barnard's sphygmometer.  
 One Stromuhr (Ludwig's).  
 One Hurtle's membrane manometer.  
 One Ludwig's mercury manometer.  
 One Laryngoscope (with throat mirrors).  
 One Fleisch's haemometer.  
 One Oliver's haemocytometer.  
 One Oliver's haemoglobinometer.  
 One Moist chamber.  
 One Onkometer for kidney.  
 One Reflecting galvanometer.  
 One Shunt.  
 One Spring myograph.  
 One Spectroscope.  
 One Saccharimeter (polariscope).

O.—M.A. OR M.SC. STANDARD

*Practical Laboratory*

(a) *Histology :—*

	Rs.
Approximate cost of equipment for 6 students	... 2,400
(b) <i>Chemical Physiology :—</i>	
Approximate cost of equipment for 6 students	... 1,800
(c) <i>Experimental Physiology :—</i>	
Approximate cost of equipment for 6 students	... 3,000
(d) <i>Galvanometer and Optical work :—</i>	
Approximate cost of equipment	... 1,200

## BOTANY

## A.—INTERMEDIATE STANDARD

(a) *Collections and Wall Diagrams*

Collection of microscopic slides.  
Botanical Wall Pictures (complete set).  
Botanical models.  
Physical Wall maps, Mercator's projection.  
Physical Geography, Wall Map of India.  
Collection of dipositives.

(b) *Lecture-room Apparatus*

Projection apparatus.  
Screen.

(c) *List of Apparatus for Practical Class of 24 students*

Microscopes, 1 doz.  
Dissecting instruments.  
Cork-borers.  
Crucible tongs, 4 in number.  
Hempel's desiccator, 2 in number.  
Two doz. drop-bottles.  
Canada Balsam bottle, 1 doz.  
Glass tubing.  
Glass rod.  
Standard measures of different capacities.  
Graduated measures.  
2 Rulcs, 1 meter long.  
Mortars and pestles.  
Pipettes.  
Air-pump plate.  
Pressure tubing.  
Flasks of different capacities.  
Funnels of different sizes.  
Burners.  
Rubber tubing.  
Test tube.  
Test tube stands, holders, cleaners.  
Thermometers.  
Woulff's bottles.  
Burettes.  
Burette stands.  
Three double bell-jars.  
Stoppered bell-jars.  
Beakers in nests.  
Aspirators, 5 litres capacity, 3 in number.  
Corks.  
Maps, 1 doz.  
Draining rack.  
Pieces of cork sheet, weighted.  
Glass capsules.  
Camel-hair brushes.



Bell-jars for microscopes.  
 One Balance and weights.  
 Staining Troughs.  
 Glass bones.  
 Filter paper.  
 Arc-indicator.  
 Stains and chemicals.  
 Flower-pot (Rs. 20).

B.—B.A. OR B.SC. STANDARD

*List of Apparatus, etc., for Practical Class of 12 Students*

*I. Morphology and Histology (For Honours and Pass Students)—*

Compound Microscopes with 2 eyepieces and 2 objectives	12
Simple Microscopes (with 2 lenses)	12
Paraffin embedding Oven	1
Microtome with knife	1
Hot Plate	1
Camera Lucidas (Drawing oculars)	3
Stage Micrometers	3
Ocular Micrometers	3
L moulds for casting paraffin blocks	1
Neccessary stains, reagents, glassware, models and charts.	

Prepared slides showing stages in meiosis and mitosis, microsporogenesis, megasporogenesis, Structure of the embryo-sac, Pollen grain, Pollen tubes and fertilisation should be available for teaching and demonstration purposes.

*II. Plant Physiology (Pass Course)—*

Water Culture Jars	7
Ganong's Potometer	3
Apparatus for determining the amount of water absorbed and given off by transpiring plants	3
Transpiration Balance	1
Transpiration tubes graduated 15 c.c. in 1/10 divisions	3
Direct vision Spectroscope	2
Ganong's Respiroscope	3
Zinc case with glass walls for observing geotropism	1
Arc Auxograph	1
Aspirator bottles	3
Balance (Sensibility up to 1/5 mg.)	1
Cobalt chloride paper	
Clips (Pinch and serow)	4 doz.
Clamps and stands	2 doz.
Calcium chloride tubes	1 doz.
Porous dishes for germination of seeds	6
Black wooden boxes with windows of different coloured glasses, white, green, red, blue, yellow	One of each kind
Beakers	4 doz.
Dessicators	2
Bell-jars	6
Thermometers	3
Flasks	4 doz.
Test tubes	12 doz.
Potash Bulbs	1 doz.
Soda lime towers	6

U-tubes	..	..	..	1 doz.
Assorted rubber corks	..	..	..	12 doz.
Measuring cylinders	..	..	..	3
Glass tubing	..	..	..	10 lbs.
Glass cutting files	..	..	..	3
Pressure tubing	..	..	..	12 yds.
India rubber tubing	..	..	..	24 yds.
Filter pumps (glass ones)	..	..	..	3
Cork borers	..	..	..	2
Funnels	..	..	..	2 doz.
Glass with horns clay funnel, 4" diameter, to demonstrate the Hydro-tropion roots	..	..	..	3

*Additional Apparatus for Honours Classes for 12 Students*

Mercury manometer for measuring root pressure	..	3
Poroscope	..	3
Porometer	..	3
Apparatus for demonstrating the diffusion of gases with clay discs	..	3
Prefer's apparatus for showing the movement of gases in the plant	..	3
Blackman's apparatus for the study of gaseous exchange through upper and lower surfaces of leaves	..	2
Ganong's Photosynthometer	..	3
Gas collecting tubes	..	6
Kuhne's fermentation vessel	..	3
Moll's apparatus for experimenting on assimilation	..	3
Apparatus for demonstrating fermentation	..	3
Ganong's leaf area cutter	..	1
Ganong's light screen	..	3
Demonstration auxograph	..	1
Klinostat	..	1
Supply of necessary chemicals and reagents.		

*III. Systematic Botany—*

Living and preserved materials (dried or in fluid) of the groups prescribed. The supply of this material should be renewed from time to time.

Prepared slides of the prescribed types including their reproductive stages should be available for teaching and demonstration.

Collecting kit, such as plant presses, vascula, specimen tubes, Herbarium supplies, etc.

*IV. Ecology—*

Instruments for the determination of the various edaphic and climatic factors should be available for teaching and demonstration.

*V. Heredity and Evolution—*

Charts and models for illustrating the facts of evolution and heredity will be required for teaching and demonstration.

Approximate cost for obtaining Apparatus and Equipment for the B.A. and B.Sc. Standard (Pass and Honours) in Botany for a Class of 12 students :—

*I. Morphology and Histology—*

(a) Microscopes	..	..	..
(b) Models and Charts	..	..	..

II. Plant Physiology—				
(a)	Pass Course	..	..	..
(b)	Additional for Honours Course	..	..	..
III Systematic Botany—				
(a)	Slides, etc. (Anatomy)	..	..	..
(b)	Museum specimens, etc.	..	..	..
(c)	Collecting kit	..	..	..
IV. Ecology—				
	Apparatus	..	..	..
V. Heredity and Evolution—				
	Charts, etc.	..	..	..

## C.—M.A. OR M.SC. STANDARD

*Practical Laboratory*

- (a) *Histological work* :—  
 Approximate cost of equipment of 6 students .. Rs. 2400
- (b) *Experimental Plant Physiology* :—  
 Approximate cost of equipment of 6 students .. Rs. 3000
- (c) *Bacteriological work* :—  
 Approximate cost of equipment of 6 students .. Rs. 600

## ZOOLOGY

## A.—INTERMEDIATE STANDARD

(a) *List of Apparatus for Practical Class of 20 Students*

Five Microscopes.  
 Dissecting instruments.  
 Twenty Troughs, fitted with cork, for dissecting small animals under water.  
 Twenty Dissecting trays.

(b) *List of Apparatus for Lecture Purpose*

Set of one hundred diagrams.  
 Skeleton of vertebrates (types).  
 Museum specimens of invertebrates.

## B.—B.A. OR B.SC. STANDARD

(a) *List of Apparatus for Practical Class*

Microscopes, 1 doz.  
 Slides, etc.  
 Dissecting troughs.  
 Dissecting trays.

Dissecting instruments.  
 One Rocking microtome.  
 One embedding bath.  
 One Hearson's incubator.

(b) *List of Appliances for Lecture Purpose*

*Additional requirements—*

One hundred diagrams.  
 Skeletons and dissected specimens and models of vertebrates.  
 Museum specimens of invertebrates.  
 Microscopical specimens.

C.—M.A. OR M.SC. STANDARD

*Practical Laboratory*

	Rs.
(a) <i>Embryological and Histological work :—</i>	
Approximate cost of equipment for 6 students	.. 3000
(b) <i>Dissecting work :—</i>	
Approximate cost of equipment for 6 students	.. 600

GEOLOGY

A.—INTERMEDIATE STANDARD

(a) *Maps :—*

Geological Wall Maps of India.  
 Physical Wall Maps of Asia and Europe.  
 Physical Wall Maps of the World.

(b) *Collections :—*

Collection of Minerals—Foote Mineral Company, Philadelphia, High School Collection of specimens No. 13A (or similar collection).

Collection of 102 glass crystal models according to Professor Baumhoner. Dr. Krantz Bonn (or similar collection).

Collection of 100 Rock specimens, according to Prof. Credner, 85 by 11 cm. with paste-board boxes in wooden case. Dr. Krantz Bonn (or similar collection).

Collection of corresponding Rock Sections. Dr. Krantz Bonn (or similar collection).

Collection of minerals illustrating physical properties. 100 minerals, 5 by 6 cm. in paste-board boxes in wooden case. Dr. Krantz Bonn collection No. 70 (or similar collection).

Collection of Geotectonic models, or wood, according to Prof. Kalkowsky. Dr. Krantz Bonn (or similar collection).

Collection of type fossils, 100 species.

Collection of Diapositive to illustrate General Geology, according to Prof. Van Calker. Dr. Krantz Bonn (or similar collection).

(c) *Lecture-room Apparatus :—*

Projection lantern.  
 Demonstration Microscope.

**(d) Practical Class Apparatus :—**

Chemical balance with set of weights.  
 6 students' balances with weights.  
 Jolly's spring balance.  
 6 Pyknometers.  
 Blowpipe set with reagents.  
 2 Zeiss achromatic pocket lenses.  
 3 Scales of hardness.  
 Contact Goniometer.  
 Clinometer, Klockmann's model, manufactured by Fuess.  
 6 boxes of drawing instruments.  
 Swift's petrological microscope.

**B.—B.A. OR B.SC. STANDARD****(a) Collections :—**

The collection specified for the Intermediate Course should be amplified and supplemented by the following :—

Blowpipe collection of 100 minerals.  
 Collection of section of minerals for the study of their special properties.  
 Collection of wooden crystal models.  
 Collection of diapositives illustrative of dynamic and structural geology.  
 Collection of specimens illustrative of dynamical, petrogenetic, and architectonic geology.

**(b) Lecture-room Apparatus :—**

Apparatus for use with the projection lantern for demonstration of interference phenomena, polarisation, double refraction, etc., with accessories.

Optical models illustrative of double refraction in crystals.

**(c) Practical Class Apparatus (in addition to that for the Intermediate Course) :—**

Four students' balances in cases (10 grammes size).  
 Four sets of gilt weights, fractional gramme weights of aluminium.  
 Open beam balance carrying 1,000 gr.  
 Set of weights, up to 1,000 grammes, nickelled.  
 Specific gravity bottles, 54 grammes with perforated stoppers.  
 Becker's specific gravity balance for liquids and solids.  
 Scales of hardness.  
 Zeiss achromatic pocket lenses, metal mounting,  $\times 6$  and  $\times 10$  (3 of each).  
 One additional contact goniometer.  
 One additional Swift's petrological microscope.  
 Reflexion goniometer.  
 Polarizing microscope.  
 Dichroscope.  
 Chemicals.  
 Chemical apparatus, for chemical mineralogy and geology.  
 Geological hammers, chisels, small rock-grinding apparatus.  
 Six blowpipe sets with reagents.

**C.—M.A. OR M.Sc. STANDARD**

No additional apparatus will be necessary for the standard.

## PSYCHOLOGY

## A.—B.A. OR B.SC. STANDARD

*Models and Charts for Anatomical and Physiological Demonstration :—*

Plastic Model showing the cerebral masses on one hemisphere and the nerve fibres on the other.

Plastic model of cerebellum and spinal cord.

Set of wax models (or collection of charts) showing the development of the foetal brain.

Charts showing brain sections and stereoscopic views of the central nervous system.

Chart showing development of brain from gymnotus to mammal.

Plastic model of the eye, showing muscles, nerves, vessels, etc.

Plastic model of the ear, showing the internal, middle and external ear.

Charts showing the anatomy of nerves and sense-organs.

Artificial eye.

Phacoscope for demonstrating accommodation of lens.

Ophthalmotrope demonstrating movements of the eye.

*Apparatus for experimental Study of Sensations :—*

Olfactometer, with accessories.

Harmonical.

Tonometer.

Tuning forks. Resonators.

Quincke's tubes.

Organ pipes.

Sonometer.

*Apparatus for testing the Appreciation of Difference in Musical Pitch :—*

Piston whistle.

Savart's toothed wheel.

Colour mixer with rotating discs.

Champimeter. Colour discs.

Stereoscope with slides.

Pseudoscope.

Set of charts with optical illusions.

Instrument for studying the muscle sensation and tactile space.

Apparatus with electric contacts for studying the time sense.

Sound hammer for experiments on time sense.

*Time Measurement of Mental Phenomena :—*

Kymograph with accessories.

Tambour with writing point.

Time marker.

Writing tuning forks.

Vermer chronoscope (with accessories).

Stop watch giving fifths of a second.

Reaction time pendulum.

Flash-light instrument with electric contact.

Touch reaction instrument.

Electric key.

Chain-reaction instrument.

Discs for chain-reaction instrument.

*Apparatus for studying Association, Attention, Discrimination, Memory, Will, etc. :—*

Material for studies in association (photographs, etc.).

Instrument for studies in association and memory.

Instantaneous shutter for association experiments.  
 Puzzle pictures.  
 Masson's discs.  
 Tachistoscope.  
 Psychodometer.  
 Ergograph.  
 Automatograph.

*Technical Outfit :—*

(a) *Optical and measuring instruments—*

Photometer.  
 Microscope.  
 Photographic camera.  
 Reading glasses.  
 Cardboard and gelatine paper of various colours.  
 Thermometer (finely graded).  
 Arometer, measuring tubes for liquids, pipettes, etc.  
 Mathematical Drawing Instruments.  
 Apothecary scale with weights.

(b) *Electric Apparatus—*

Leclanché's cells.  
 Grove cells.  
 Induction coil.  
 Electromagnet.  
 Galvanometer with mirror.  
 Electrodes, electrical connection and wires.

(c) *Miscellaneous—*

Surgical outfit (scissors, forceps, etc.).  
 Set of carpenter's tools.  
 Glass apparatus (tubes, rods, jars, funnels, etc.).  
 Metal stands and rods.  
 Rubber tubes, rubber bands, rubber atomisers, etc.  
 Brass and copper sheets, nails, screws, hooks, etc.  
 Drawing materials, paper, coloured papers, etc.  
 Smell and taste solutions.

B.—M.A. OR M.Sc. STANDARD

In addition to the apparatus required for the B.A. or B.Sc. standard, the following :—

*Models and Charts for Anatomical and Physiological Demonstrations :—*

Plastic model showing the course of the nervo-fibres throughout the encephalic mass.  
 Model showing the convolutions, the moridian section and the horizontal section.  
 Model of various heads showing the brain.  
 Model showing mechanism of the ear.

*Apparatus for experimental Study of Sensation :—*

Differential Sonometer.  
 Siren.  
 Electric bells.  
 Electric phonometer.  
 Instruments for successive contrast and irradiation.  
 Apparatus for diagnosing colour blindness.  
 Apparatus for appreciation of colour.  
 Micrometer shutter for studying minute fields of colour.

**Perception and Estimation of Spatial and Temporal Magnitudes :—**

Instrument for estimating angular divisions.

Mirror pseudoscopes.

Set of instruments for studying space in co-ordinated movements of both arms.

**Time Measurement of Mental Phenomena :—**

Chronoscope measuring the hundredth part of a second.

Machine for measuring reaction time by a falling rod.

Drop window for the sudden exposure of colours, numbers, etc.

Telegraph keys with sounder.

Reaction key with buttons.

**Association, Attention, Discrimination, Memory, Emotion, Will, etc. :—**

Instrument for studying the complication of perceptions.

Instrument for studying the movements during the emotions (by Elbs Freiburg).

Myograph Sphygmograph Pneumograph.

## GEOGRAPHY

## INTERMEDIATE STANDARD

*I.—Teaching and Demonstration***A. General :—**

Terrestrial Globe. Wall-maps (continents and principal political divisions). Magic Lantern with slides. Large atlas.

Stereoscope with slides illustrative of Descriptive Geography (principal countries of the world with interesting scenes and monuments).

**B. Special :—****(a) Mathematical (or Astronomical) Geography—**

An orrery. Diagrams and magic lantern slides illustrative of the solar system and its configuration, changes of the seasons, varying lengths of day and night. Solar and lunar eclipses, phases of the moon tides.

Diagrams showing relative local time for principal cities.

Tables of latitude and longitude.

Stellar chart for identifying the pole star and chief circumpolar constellations.

**(b) Orographical and Hydrographical Wall-Maps for studying Distribution of Land and Water—**

Maps showing contour of the land and principal mountain systems, lines of drainage, water basins, river systems and deltas.

Relief map of India.

Ocean charts showing ocean depths and contour of the ocean floor, ocean currents with surface temperature: coral and other reefs, ocean deposits.

Maps of Arctic and Antarctic Regions.

**(c) Stratigraphical Charts and Diagrams—**

Diagrams explaining varieties of stratification section of a coal-field in Bengal.

Geological Survey map of India.



- (d) Botanical and Zoological Charts—  
Charts showing the distribution (1) of plants (2) of animals.
- (e) Ethnographical and Demographical Wall Maps showing the Distribution of Man and his Industries :—  
Anthropological charts showing the distribution of the Races of man. Stereoscopic and lantern slides showing chief racial types. Maps showing distribution of (1) mineral products, (2) vegetable products including food-stuffs (India).  
Maps showing railway lines (India).  
Maps showing ports and harbours—ocean highways.
- (f) Statistical Charts and Diagrams more especially with regard to India.

## II. *A Small Collection of the Chief Minerals and Economic Products of India*

### III.—*Practical Course*

A.—Cartography, drawing plans and maps, projections, orientation and determination of latitude, and modelling in sand and clay.

*Two sets of the following appliances for a class of 20 students :—*

- Drawing materials and instruments with special reference to Cartography.
- Measuring Tape and Chain.
- Mariner's Compass.
- Magnetic Needle.
- Spirit-level and Plumb line.
- Clinometer.
- Clay-modelling tool-palette knife.
- Magnifying Lens.

B. Meteorological observations.

*One set of the following instruments for a class of 20 students :—*

- Two ordinary thermometers.
- Maximum and Minimum thermometers.
- Thermometer screen.
- Barometer (with vernier and thermometer).
- Dry and wet bulb thermometer.
- Hygrometric Tables.
- Rain gauge.
- Wind-direction. Compass-card and wind vane.

C. Meteorological charts (with Meteorological tables, where necessary) for studies in atmospheric distribution—

- (a) Curves showing annual and diurnal ranges of temperature, and of pressure (of typical localities, including Calcutta and London).
- (b) Isothermal lines, showing the mean temperature of the globe (1) for the year, (2) in January and (3) in July.
- (c) Lines showing the mean barometrical pressure and the prevailing winds of the globe, (1) for January, (2) for July.
- (d) Lines showing periodical winds (including the monsoon).
- (e) Simple diagrams showing the direction of gyratory movements of the wind in the Northern and the Southern Hemispheres.

- (f) Weather charts, isobars, gradients, areas of depression and their shiftings, tracks of cyclones north and south of the lines.
- (g) Rainfall chart for the globe.  
Rainfall chart for India.
- Chart showing monthly rainfall for Calcutta and London.
- (h) Daily weather chart for Calcutta.

*Revised Note regarding Syllabus for the Practical Course in Geography for the Intermediate Standard*

Hours of Practical Work—The same hours should be devoted to practical work as in the case of other science subjects such as Physics and Chemistry.

1. Reading of the following meteorological instruments on any four days, preferably in the months of July to September :—
  - (a) Maximum and Minimum Thermometer.
  - (b) Dry and Wet Bulb Thermometer.
  - (c) Barometer.
  - (d) Rain Gauge.
2. Plotting of Meteorological data.  
Drawing of graphs from given data on
  - (a) Rainfall.
  - (b) Temperature.
  - (c) Pressure.
3. Map projection.  
Drawing an outline map of Africa or South America on Cylindrical equal area projection by graphical method.  
Tracing of two outline maps of the World on Mercator and Mollweide projections and comparing their advantages.
4. Interpretation of the following maps as far as available or maps representing similar areas (scale 1" = 1 mile).
  - (i) Part of Burdwan, Bankura and Manbhum Districts—Index No. 73 1/14.
  - (ii) Sundarbans—Index No. 79 G/5.
  - (iii) Calcutta and adjoining parts.
  - (iv) Parts of Sylhet and Khasi Hills.
5. Drawing of isobars and isotherms on outline maps of India from given data.
6. Showing the distribution of population on a map of Asia by shading and on a map of India by dot method.
7. Showing the distribution of crops and minerals on a map of India.
8. (a) Surveying a plot of land by chain.  
(b) Construction of scales and drawing of plan.

**B.A. AND B.Sc. PASS STANDARD**

*List of Appliances and Maps required for affiliation in Geography up to the B.A. and B.Sc. Pass Standard*  
*I. Teaching and Demonstration*

In addition to the Intermediate standard :—

- (a) Models illustrating evolution of land forms and drainage systems (may be supplied by the Geography Department, Calcutta University).
- (b) Slides—For Physical Geography .. 100  
For Regional Geography .. 200  
(may be supplied by the Geography Department, Calcutta University).
- (c) Standard Wall Maps of important countries.
- (d) Epidiascope or Lantern.

II. *Practical Work*

In addition to the Intermediate Standard—

(a) Cartographical representation of meteorological and economic data : Daily and Monthly Weather charts published by the Meteorological Department, Alipore.

Aza printing set for duplicating maps—1.

Glass top table with lighting arrangements for—

Tracing maps—1 for 5 students.

Pentograph—1 for 5 students.

Planimeter—1 for 5 students.

(b) Surveying :

Measuring chain, tape and ranging rod—1 set for 6 students.

Plane-table—1 set for 5 students.

Prismatic compass—1 set for 5 students.

(c) Topographical Maps :

Sets comprising one  $\frac{1}{4}$ " one  $\frac{1}{2}$ " and one 1" maps—1 set for each student.

(d) Geological maps :

Sets comprising one map showing horizontal beds and one showing anticlines and synclines—1 set for each student (may be supplied by the Geography Department, Calcutta University).

(e) Rock-forming and economic minerals :

Sets comprising	{	Quartz—1
		Felspar—1
		Mica—1
		Heamatite—1
		Selena—1
		Coal—1

(each measuring not less than 2" × 2" × 2"—1 set for 5 students.

(f) Chief types and rocks :

Sets comprising	{	Granite—1
		Basalt—1
		Sandstone—1
		Shale—1
		Limestone—1
		Conglomerate—1
		Gneiss—1
		Marble—1
		Quartzite—1

(each measuring not less than 6" × 6" × 6"—1 set for 5 students.

(g) Cereals and Fibres :

Sets comprising Wheat, Barley, Paddy, Jowar, Bazra, Maize and Sugarcane—1 set for 5 students.

Sets comprising Jute, Cotton, Hemp and Flax—1 set for 5 students.

## CHEMISTRY

## A.—INTERMEDIATE STANDARD

*List of Apparatus for 20 students working in pairs*

	Quantity
Aspirator 10 litre capacity .. .. .	2
Balance with agate knife edges and planes, graduated beam, beam support, thick glass vessel, double hook and polished mahogany stool for specific gravity experiments, to carry 250 gms. sensitive to 1 mg. .. .. .	4
Analytical weights .001 to 100 gms. .. .. .	4 sets

	Quantity
Dispensing scales with weights .. .. .	1
Basin evaporating Royal Berlin	
Porcelain with spout capacity 80 cc. .. .	1 doz.
Ditto ditto ditto 100 cc. .. .	2 doz.
Ditto ditto ditto 300 cc. .. .	1 doz.
Sand bath deep, diam. 10 cm. .. .	1 doz.
Steam bath (to be made locally) .. .	
Beakers, Bohemian glass, without lip capacity 90 cc. .. .	1 doz.
Ditto ditto ditto 140 cc. .. .	2 doz.
Beakers, Jena glass, No. 2, capacity 500 cc. .. .	1 doz.
Ditto ditto 6 capacity 150 cc. .. .	1 doz.
Foot blower, size No. 3 .. .	2
Extra rubber disc for No. 3 .. .	4
Extra nets .. .	2
Blowpipe Universal with ball socket movement .. .	2
Mouth Blowpipe nickel-plated .. .	1 doz.
Bottles, best Bohemian glass—	
N. M., without stopper, 150 cc. .. .	6 doz.
N. M., flat-stoppered, for reagents with carefully ground stoppers, capacity 60 cc. .. .	6 doz.
N. M., flat-stoppered, for reagents with carefully ground stoppers, capacity 150 cc. .. .	1 gross
N. M., flat-stoppered, for reagents with carefully ground stoppers, capacity 250 cc. .. .	
Bottles, W. M., flat-stoppered, capacity 60 cc. .. .	6 doz.
Ditto ditto ditto 225 cc. .. .	6 doz.
Woulff's bottles with two necks, one in centre and one on shoulder, capacity 250 cc. .. .	2 doz.
Burettes with stop-cocks (c. form), lateral, normal calibrated 50 cc.—1-10 .. .	1 doz.
Bunsen burner with air regulator, diam. 1 cm. .. .	2 doz.
Star support for the above .. .	1 doz.
Chimney, conical for the above .. .	1 doz.
Blowpipe jet for the above .. .	1 doz.
Bench light burners for bending glass tubes .. .	6
Fletcher's safety, Bunsen, No. 10 .. .	3
Cylindrical cans for boiling water, Condensers Liebig's inner tube fitted with I.R. cork, 40 c.m. .. .	$\frac{1}{2}$ doz.
Connectors, double (for batteries) .. .	2 doz.
Corks, finest quality, 23.25 mm. long, 2 mm. taper, diam. of top 16 mm. .. .	6 doz.
Corks, finest quality 23-25 mm. long, 2 mm. taper, diam. of top 20 mm. .. .	1 gross
Corks, finest quality, 32 mm. long head measure 30 mm. .. .	1 gross
Ditto ditto ditto 40 mm. .. .	4 doz.
Ditto ditto ditto 50 mm. .. .	2 doz.
Corks, India Rubber, best quality, red—	
Size 1 diam. of bottom 13 mm. top 16 mm. .. .	2 doz.
Size 3-A ditto 25 mm. top 29 mm. .. .	2 doz.
Size 5 ditto 29 mm. top 35 mm. .. .	2 doz.
Corks-borers, of brass tube with rod, nickel-plated, in sets of 3	1 doz. sets
Cork-borers, of brass tube with rod nickel-plated, in sets of 12	2 sets
Cork-pressures, cast iron, heavy 25 cm. long. .. .	2
Covers for beakers, concave (clock glass), diam. 7 $\frac{1}{2}$ cm. .. .	2 doz.
Crucibles, Berlin porcelain, with cover, No. 0, 14 cc. .. .	2 doz.
Crystallising dishes, flat bottom, with spout, 5 cm. deep, 10 cm. diam. .. .	2 doz.
Desiccators, Scheibler's with ground glass cover, 15 cm. diam. of top .. .	4

	Quantity
Desiccator discs, perforated circles of Berlin porcelain to fit above 11 cm. . . . .	4
Files, round, 13 cm. long, without handles . . . . .	1 doz.
Files, triangular, 13 cm. long, without handles . . . . .	1 doz.
Filter discs, perforated, Berlin porcelain, for use in funnels, true circular, 64 mm. diam. . . . .	4
Filter papers, Schleicher and Schull, cut circular, No. 595 for qualitative work, diam. 9 cm. . . . .	1,000
Filter papers, Schleicher and Schull, cut circular, No. 595 for qualitative work, diam. 11 cm. . . . .	1,000
Flasks, Bohemian, flat bottom, capacity 200 cc. . . . .	1 doz.
Ditto ditto ditto 500 cc. . . . .	2 doz.
Ditto round bottom ditto 200 cc. . . . .	1 doz.
Ditto ditto Jena glass, short neck, 500 cc. . . . .	1 doz.
Flasks with side tube from neck, straight 200 cc. . . . .	1 doz.
Flasks, Jena glass, conical, Erlenmeyer's, capacity 200 cc. . . . .	1 doz.
Measuring flasks, standard, gauged at one mark, stoppered neck, 250 cc. . . . .	1 doz.
Measuring flasks, standard, gauged at one mark, stoppered neck, 1,000 cc. . . . .	1 doz.
Funnels, Bohemian glass, with ground edges, sides inclined at 60 degrees, plain, diam. 6 cm. . . . .	1 doz.
Funnels, Bohemian glass, with ground edges, sides inclined at 60 degrees, plain, diam. 8 cm. . . . .	1 doz.
Funnels, Bohemian glass, with ground edges, sides inclined at 60 degrees, plain, diam. 19 cm. . . . .	4 doz.
Funnels, Bohemian glass, with ground edges, sides inclined at 60 degrees, ribbed, 8 cm. . . . .	6
Safety funnels with long tube for fitting up glass flasks, etc., thistle head, 32 cm. long . . . . .	1 doz.
Safety funnels, with long tube, etc., with bend and one bulb thistle, 30 cm. . . . .	$\frac{1}{2}$ doz.
Gas jars, cylindrical with ground flange, Bohemian glass, 21 x 4 cm. . . . .	1 doz.
Gas jars, cylindrical with ground flange, Bohemian glass, 32 x 5 cm. . . . .	1 doz.
Ground glass, discs, diam. 5 cm. . . . .	1 doz.
Ditto ditto 6 cm. . . . .	1 doz.
Graduated gas jar with spout on glass foot, scale descending, capacity 100 cc. . . . .	4
Graduated gas jar with spout on glass foot, scale descending, capacity 500 cc. . . . .	4
Kipp's apparatus, bulb 100 cm. diam. . . . .	3
Magnets . . . . .	2
Mortars and Pestles . . . . .	12
Ditto iron . . . . .	1
Pinch Cocks . . . . .	12
Pipettes, 5 cc. . . . .	12
„ 10 cc. . . . .	12
„ 25 cc. . . . .	12
Platinum foil, .01 mm. thick . . . . .	5 gms.
Platinum wire, 25 mm. . . . .	5 gms.
Pliers, steel . . . . .	2
Apparatus for showing diffusion . . . . .	1 set
Retorts, 70 cc. . . . .	1 doz.
„ 150 cc. . . . .	1 doz.
Retort stand . . . . .	12
Clamps for flasks . . . . .	12
Glass rods . . . . .	$1\frac{1}{2}$ kgm.

	Quantity
Boxwood rulers .. .. .	2
Deflagrating spoons .. .. .	12
Iron spoon for burning phosphorus .. .. .	6
Test tube, thin glass .. .. .	4 gross
Boiling tubes .. .. .	4 doz.
Test tube brushes .. .. .	12
Test tube stands .. .. .	12
Thermometers up to 200° C. .. .. .	6
Ditto 360° C. .. .. .	6
Crucible tongs .. .. .	1 doz.
Graduated tubes .. .. .	12
Pneumatic troughs .. .. .	1 doz.
Glass tubing .. .. .	3 kgm.
Hard glass tubing .. .. .	1 kgm.
Jena glass combustion tubes .. .. .	2 kgm.
I. R. tubing, best, int. diam. 4 mm. .. .. .	12 yds.
Ditto ditto 10 mm. .. .. .	24 yds.
Watch-glass .. .. .	2 doz.

*To be purchased locally*

Wire gauge, iron, 40 holes to an inch.

" " copper, 40 holes to an inch.

Wire, iron

Wire, copper

Tripods .. .. . 1 doz.

CaCl. tubes .. .. . 1 doz.

Reagents for practical class of 20 students.

*List of Chemical Apparatus for Lecture Work, Intermediate Examination*

	Approximate quantity required.
Evaporating Basin of aluminium, fig. 3, strong, polished, pure 10 cm. diam. with spout .. .. .	1
Ditto of " R " resistance glass with spout, 70 mm. diam. .. .. .	6
Ditto Royal Berlin Porcelain with spout, glazed inside and out—	
No. 00 capacity 50 cc. .. .. .	6
" 1 " 100 cc. .. .. .	6
" 2 " 140 cc. .. .. .	6
" 4 " 200 cc. .. .. .	6
Ditto glazed inside and partially outside—	
No. 5 capacity 300 cc. .. .. .	3
" 6a " 535 cc. .. .. .	2
" 7 " 765 cc. .. .. .	2
Beakers, Bohemian glass, without spout—	
No. 0 capacity 50 ccm. .. .. .	6
" 1 " 90 ccm. .. .. .	6
" 2 " 140 ccm. .. .. .	6
" 3 " 200 ccm. .. .. .	6
" 4 " 325 ccm. .. .. .	6
" 9 2 litres capacity .. .. .	2

	Approximate quantity required.
Beakers of resistance, " R " glass, wide shape, with spout—	
No. 1 capacity 150 cc. . . . .	6
" 2 " 200 cc. . . . .	6
" 3 " 300 cc. . . . .	6
" 4 " 500 cc. . . . .	6
" 5 " 750 cc. . . . .	6
" 6 " 1,000 cc. . . . .	3
Covers for Beakers, gas jars, etc., ground one side glass circle—	
Diam. 5 cm. . . . .	3 doz.
" 7 cm. . . . .	3 doz.
" 10 cm. . . . .	3 doz.
Ditto with hole in centre—	
Diam. 7½ cm. . . . .	1 doz.
" 10 cm. . . . .	6 doz.
Ditto concave (clock glasses)—	
Diam. 6½ cm. . . . .	2 doz.
" 9 cm. . . . .	1 doz.
Tripods, with circular top and iron legs—	
Height 15 cm. . . . .	6
" 18 cm. . . . .	6
Sand bath dishes, shallow, stout, sheet iron, flat bottom, 10 cm. diam. . . . .	3
Asbestos mill board, thickness of sheet $\frac{1}{8}$ in., weight per sheet 40" × 40", 4 lbs. . . . .	4 lbs.
Asbestos yarn $\frac{1}{8}$ " diam. . . . .	1 lb.
Batwing burner, height 30 cm. . . . .	2
Flat flame Bunsen burners, for bending glass and heating tubes length of opening at the mouth 15 cm. . . . .	1
Bunsen gas burner with air regulation . . . . .	6
Rosetop for ditto ditto . . . . .	3
Star support for chimneys . . . . .	4
Iron chimneys, conical . . . . .	4
Blowpipe jets . . . . .	4
Teclu gas burner, large size . . . . .	2
Head Fig. A, to fit ditto . . . . .	2
" " B, to fit ditto . . . . .	2
" " C, to fit ditto . . . . .	2
Chimneys with clamping screw . . . . .	2
Fletcher's safety Bunsen, No 5 . . . . .	2
Spirit lamps with extra neck, capacity 20 cc. . . . .	6
Flasks, Bohemian, flat bottom . . . . .	1 doz.
Capacity 75 cm. . . . .	1 doz.
" 175 cm. . . . .	1 doz.
" 250 cm. . . . .	1 doz.
" 400 cm. . . . .	1 doz.
" 500 cm. . . . .	1 doz.
" 750 cm. . . . .	1 doz.
" 3 litres . . . . .	4
Flasks, 500 cc. . . . .	6
Flasks of " R " resistance glass—	
Shape D, capacity 75 cc. . . . .	1 doz.
" " 250 cc. . . . .	1 doz.
" " 500 cc. . . . .	1 doz.
" " 750 cc. . . . .	6
" " 1,000 cc. . . . .	4

	Approximate quantity required.
Shape D, capacity 1,500 cc. .. ..	3
" D, of extra hard glass for preparing Oxygen, round bottom—	
Capacity 150 cc. .. ..	1 doz.
" 250 cc. .. ..	6
Flasks of " R " resistance glass, Erlenmeyer's capacity 200 cc. ..	6
Bolt head flask, 3,000 cc. capacity .. ..	2
Retorts, stoppered, etc.—	
Capacity 150 cc. .. ..	1 doz.
" 250 cc. .. ..	1 doz.
Receivers, with three necks, capacity 3 litres .. ..	2
Retorts without tubulure and stopper, capacity 250 cc. .. ..	6
Ditto ditto capacity 500 cc. .. ..	6
Retorts with tubulure for cork—	
Capacity 250 cc. .. ..	6
" 500 cc. .. ..	3
Gas-generating apparatus, 40 cm. long .. ..	2
Gasholders, 25 litres capacity .. ..	1
Retort stands, 24 in. long .. ..	6
Clamp, of malleable iron .. ..	6
Liebig's condenser, glass jacket and tube and length of body 60 cm. .. ..	6
Liebig's condenser, glass jacket and tube and length of body 80 cm. .. ..	2
Condensation tube, U-tube, 30 cm. long .. ..	2
Condensor stand .. ..	2
Funnels, glass sides, inclines at 60, plain—	
Diam. 5 cm. .. ..	1 doz.
" 7½ cm. .. ..	1 doz.
" 10 cm. .. ..	1 doz.
" 15 cm. .. ..	3
" ribbed, 10 cm. .. ..	6
Condenser with one tubulure and worm, length of jacket 25 cm. diam. 7½ .. ..	2
Funnels separatory, and—	
Capacity 60 .. ..	6
" 100 .. ..	6
Glass tubing for bending, Nos. 2, 3 and 5 .. ..	4 kg.
Ditto No. 11 .. ..	5 kg.
Combustion tubing, best Bohemian, 5 to 10 mm. diam. Nos. 2 to 6, assorted .. ..	2 lb.
Jena combustion tube, 12 to 15 mm. outside diam. assorted ..	4 lb.
Glass cutting tools, set of 12, semi-circular .. ..	1 set
Set of glass blower's tools .. ..	1 set
Files, round, 10 cm. long, without handle .. ..	6
Files, triangular, 10 cm. .. ..	3
Rasps, half round, 15 cm. .. ..	2
Flat files, 15 cm. .. ..	2
Corks, 23-25 mm. long. 2 mm. taper, diam. of stop 29 mm. ..	6 doz.
Corks, 32 mm. long. 2 mm. head measure 30 mm. .. ..	3 doz.
Corks, 32 mm. long. 2 mm. head measure 40 mm. .. ..	3 doz.
Corks, 32 mm. long. 2 mm. head measure 50 mm. .. ..	3 doz.
Corks, India rubber, red, size I, diam. of bottom 13 mm., top 16 mm. .. ..	2 doz.
Corks, 3a ditto 2b ditto 29 .. ..	2 doz.
Corks, 4 ditto 29 ditto 33 .. ..	2 doz.
Cork borers in sets of 12 .. ..	1 set



	Approximate quantity required
Cork presser, wheel pattern .. ..	1
Cork borer sharpener for No. 983 .. ..	1
Tubing, best India rubber, red, int. diam. 4 mm. ..	12 yds.
Ditto ditto ditto 10 cm. ..	12 yds.
Universal blowpipe .. ..	1
Footblower, size No. 3 .. ..	1
Mouth blowpipe, nickel-plated .. ..	2
Platinum foil, 0.3 mm. thick, 100 sq., 1 cm., weighing 5 gms. ..	10 gms.
Platinum wire, 25 mm., diam. 1 metre .. ..	6 gms.
Steel hammers, 15 mm., square face .. ..	2
Anvils .. ..	2
Horseshoe magnets, 20 cm. long .. ..	1
Mortars and Pestles, diam. 8 cm. .. ..	3
Ditto ditto 15 cm. .. ..	2
Ditto, iron, bowlshape, diam. 5" .. ..	1
Forceps .. ..	2
Crucibles, Royal Berlin porcelain, with cover--	
No. 1, 25 cc. .. ..	3
No. 3, 80 cc. .. ..	3
Tongs, 15 cm. long .. ..	3
" for picking up mercury .. ..	1
" 61 cm. long .. ..	1
Spatulas, 15 cm. long .. ..	4
" 20 cm. .. ..	2
Pliers, steel and 6" long .. ..	2
Scissors, 6 in. long .. ..	1 pair
Watchmaker's vice .. ..	1
Watch glass clips, diam. 10 mm. .. ..	2
Bottles, 125 cc. N. M. with stoppers .. ..	3 doz.
250 cc. do. do. .. ..	3 doz.
" 300 cc. do. do. .. ..	2 doz.
" 750 cc. do. do. .. ..	1 doz.
Bottle's cap 2 oz., N. M., with stoppers .. ..	3 doz.
Ditto 6 oz. .. ..	3 doz.
Ditto 12 oz. .. ..	2 doz.
Ditto 20 oz. .. ..	1 doz.
Bottle's W. M. flat-stoppered, cap 4 oz. .. ..	2 doz.
Ditto ditto ditto 8 oz. .. ..	2 doz.
Ditto ditto ditto 10 oz. .. ..	1 doz.
Specimen bottles, diam. 6 cm., int. diam. 4 cm. ..	2 doz.
Jars, cylindrical, etc., 15 cm. high .. ..	1 doz.
Ditto 4, etc., 20 cm. .. ..	1 doz.
Ditto 5, etc., 30 cm. .. ..	1 doz.
Ditto 6½, etc., 40 cm. .. ..	6
Jars, graduated, cap. 200 cc. .. ..	2
Gas jars, 500 cc. cap. .. ..	2
Bell-jars, cap. 2 litres .. ..	3
Deflagrating jars, 10 cm. diam. .. ..	2
Ditto globes, diam. 30 cm. .. ..	2
Detonating bottle .. ..	2
Balloons, collodion, cap. 800 cc. .. ..	1 doz.
Ditto ditto 1,500 cc. .. ..	6
Deflagrating spoons with brass cap .. ..	6
Iron spoons for burning P or S .. ..	4
Deflagrating stands .. ..	2
Pneumatic trough, length 36 cm. .. ..	1
" circular 16 cm. deep .. ..	1

	Approximate quantity required
Beehive shelves, diam. 10 cm. .. ..	1
Pneumatic trough, porcelain, 18 cm. long .. ..	1
"      trough, 50 cm. long .. ..	1
Funnels, long neck, 30 cm. long .. ..	1 doz.
Ditto      46      ditto .. ..	6
Funnels, safety, medium .. ..	6
Kipp's apparatus, 1 litre cap .. ..	4
Chloride of calcium tube, 20 cm. long .. ..	6
U-shaped, length of limb 16 mm., diam. of limb 15 cm. ..	6
U-shaped, 15 cm. long— 20 mm. diam.      }	
15 cm. diam.      }	6
Chloride of calcium jars, height 25 cm. .. ..	6
Absorption tubes, Babo's .. ..	6
Gas Washing bottle, cap. 150 cc. .. ..	6
Eudiometer, 40 cm. long .. ..	2
Bunsen's gas voltmeter .. ..	1
Gas tubes, sealed at one end, cap. 50 ccm. in 1/10 .. ..	2
"      glass stop-cock at top 50 ccm. 1/5 .. ..	2
Schroedter's apparatus .. ..	1
Aspirators, 4 litres cap. .. ..	2
Set of four burners, etc. .. ..	1
Ramsay's tube heater with burner .. ..	1
Erlenmeyer's combustion furnace (15 burners) .. ..	1
Standard delivery pipettes—	
1 cc. .. ..	2
2 cc. .. ..	2
5 cc. .. ..	2
10 cc. .. ..	2
25 cc. .. ..	2
50 cc. .. ..	2
Standard flasks with one mark, 250 cc., with stopper .. ..	2
Ditto      ditto      500 cc. .. ..	2
With spout, 200 cc. .. ..	1
Normal burettes with stop-cock, 50 by 1/10 cc. .. ..	2
Ditto      for pinch-cock, 50 by 1/10 cc. .. ..	2
Burette floats .. ..	4
Burette stands, iron .. ..	1
Burette clips, No. 3, 18 mm. .. ..	1 doz.
Specific gravity flasks, 25 gms. .. ..	2
"      tube, Sprengel's 10 gms. .. ..	2
Hydrometers	
Normal Thermometers from 0 to 100 .. ..	3
Ditto      ditto      0 to 360 .. ..	2
Vacuum desiccator, inside diam. 14 cm. .. ..	1
Desiccators' Hempel's, diam. 10 cm. .. ..	1
Ditto      Ditto      10 cm. .. ..	1
Brass syringe for exhausting and condensing, length of barrel, 13 cm. diam. 2½ cm. .. ..	1
Bell glass receiver int. height 20 cm., outside diam. 18 cm. ..	2
Davy's No. 4 Safety lamp .. ..	1
Glass stop-cocks, bore 2 mm. .. ..	6
Test tube, int. diam. ½", 10 cm. long .. ..	1 gross
Ditto, int. diam. ⅜" 10 cm. .. ..	6 doz.
Ditto, 6" long, 1" diam. .. ..	3 doz.
Test tube holders, cork-lined, No. 1 .. ..	2
Test tube of hardest combustion glass, 50 mm. by 10 mm. ..	2 doz.

	Approximate quantity required.
Test tube of hardest combustion glass, 75 mm. by 13 mm.	2 doz.
Test tube, int. diam. $\frac{1}{4}$ ", 10 cm. long .. ..	1 gross
Ditto int. diam. $\frac{3}{8}$ ", 10 cm. .. ..	6 doz.
Ditto 8" long. 1" diam. .. ..	3 doz.
Decomposition of water app. complete .. ..	1
Ozone apparatus (Siemens Brodie's or Newth's) ..	1
Grove's battery, etc., of set six .. ..	1 set
Connectors' double large, S. W. G. .. ..	1 doz.
Copper wire, silk covered, double .. ..	1 lb.
Induction coils, Ruhmkorff's, with Ruhmkorff's commutator length of spark 75 mm., No. 9 .. ..	1
Apparatus to determine the proportion by vol. elementary gases contained in one vol. of HCl with metal stand ..	1
Apparatus for vol. analysis for ammonia by chlorine and hypobromite of sodium .. ..	1
Apparatus for determination of volumetric composition of NH <sub>3</sub> by sparking .. ..	1
Apparatus to demonstrate that H and Cl combine to form HCl without alteration of vol. .. ..	1
Apparatus to show that HCl is produced by the combination of one vol. of H with one of Cl .. ..	1
Apparatus to prove that water contains two vols. of H and one of O (both limbs graduated) .. ..	1
Apparatus for the decomposition of HCl, carbon electrodes ..	1
Iron stand for the above .. ..	1
Apparatus to illustrate the effect of pressure and temperature on gases, complete .. ..	1
Apparatus to illustrate that when H and O combine to form water, the vol. measured at 100 is reduced by 1/3 .. ..	1
Iron Tripod for condenser .. ..	1
Stand .. ..	1
Apparatus for the decomposition of steam by sparking ..	1
Apparatus to show that O has the same vol. as the CO <sub>2</sub> and SO <sub>2</sub> produced from it .. ..	2
Stands for the above .. ..	2
Apparatus for producing Nitric peroxide from air .. ..	2
Apparatus to show the phenomena of diffusion complete with stand .. ..	1
Apparatus for obtaining equal vols. of Cl and H by electrolysis	1
Atomic weight chart .. ..	1
Woulff's bottles with two necks, 250 cap. .. ..	6
Ditto ditto 500 cap. .. ..	6
Apparatus for illustrating Boyle's Law .. ..	1
Cast iron bottles with screwed stopper for bursting when frozen	
Schleicher and Chüll's No. 595 Filter paper in sheets of 47 by 54 cm. .. ..	100
Ditto Circular No. 595 7 cm. .. ..	500
Ditto ditto ditto 9 cm. .. ..	500
Ditto ditto ditto 11 cm. .. ..	500
Ditto ditto ditto 24 cm. .. ..	250
Steam bath.	
Air bath.	
Sieves.	
Iron wire gauze.	
Reagents, etc., for Lecture room.	

## B.—B.A. OR B.Sc. STANDARD

(a) *Practical (in addition to the Intermediate Standard apparatus)*

	Approximate quantity required.
Basins of lead with round bottom with spout $7\frac{1}{2}$ cm. diam.	4
Air bath.	
Steam bath.	
Crucibles, fire clay, triangular .. ..	12
Covers for above .. ..	12
Crucibles and cover of platinum .. ..	1
Flask, Bohemian, flat bottom, cap. 200 cc. ..	6
Kjeldahl Flask, round bottom, long neck, cap. 300 cc. ..	2
Conical flasks, 400 cc. .. ..	1
Hot water funnels of copper with glass funnel ..	2
Separating funnels .. ..	2
Filter pumps .. ..	2
Specific gravity flask with perforated stopper ..	3
Pipe clay triangle .. ..	12
CaCl <sub>2</sub> tube .. ..	12
Barometer tubing .. ..	1 kg.
Will and Varrentrap's bulbs .. ..	2
Combustion furnace .. ..	1
Platinum crucible .. ..	1

Reagents for practical class of 15 students.

(b) *List of Apparatus for Lecture Work (in addition to the Intermediate Standard)*

	Approximate quantity required.
Nickel basin, 10 cm. diam. weight 9 oz. (Troy) ..	1
Platinum basin with spout, 70 cc. cap. ..	1
Water bath, enamelled iron, with tripod stand, diam. 16 cm.	1
Flasks, conical, Jena glass, Erlenmeyer's—	
Cap. 200 cc. .. ..	6
" 300 cc. .. ..	6
Distillation flasks, 100 cc. .. ..	2
Ditto 250 cc. .. ..	3
Ditto 500 cc. .. ..	2
Fractional distillation tube with two bulbs ..	1
Ditto 30 cm. long .. ..	1
Ditto cap $1\frac{1}{2}$ litre .. ..	3
Receivers with three necks, $11\frac{1}{2}$ litre ..	3
Crucible and cover roses with gas leading tube ..	3
Ditto of platinum, cap. 35 cm. ..	1
Crucible of copper with cover, diam. 8 cm. ..	2
Crucible of copper with cover, diam. 12 cm. ..	2
Pipe clay triangles .. ..	1 doz.
Crucible, No. D. 10 cm. high .. ..	2
Covers for the above .. ..	2
Tongs, Nickel-plated, 20 cm. long .. ..	4
" for picking up mercury .. ..	1
Potash bulb, Geissler's .. ..	2
Ditto Will and Varrentrap's .. ..	2

	Approximate quantity required.
Kjeldahl flasks, 300 ccm. cap. .. ..	3
Pear-shaped glass heads with safety trap .. ..	2
Nitrometer, Schiff's .. ..	1
Carius Furnace .. ..	1
Cupels of bone ash 25 mm. diam. .. ..	3
Apparatus for superheated steam, length of body 80 cm. ..	1
Liebig's condensers, total length 105 cm. .. ..	2
Anschutz Thermometers, Nos. 1-5 .. ..	1 set
Beckmann's Thermometer, Range of Scale 6° in 1-100° C ..	1
Manometer .. ..	1
Standard Barometer .. ..	1
Dialysers, Bell-shaped glass, diam. 10 cm. .. ..	2
Dialysis paper 21½ .. ..	1 doz. sq.
Pfeffer's apparatus, cap. 150 cc. .. ..	1
Melting point apparatus .. ..	1
Apparatus for the preparation of acetylene from H and C ..	1
Acetylene gas apparatus .. ..	1
Vapour density bulbs, 400 cm. cap. .. ..	3
Dumas bath with holder .. ..	1
Vapour density apparatus, V. Meyer's .. ..	2
Small stoppered bottles .. ..	6
Outer bulb .. ..	2
Beckmann's depression of freezing point apparatus, complete set .. ..	1 set
Beckmann's boiling point apparatus, with boiling flask ..	1
Steam jacket, porcelain	
Thermometer—0-2000 for giving the temperature of the steam bath .. ..	1
Spiral condensers .. ..	1 set
Glass beads, etc. .. ..	1 set
Stand with clamp and boss .. ..	2 sets
Two Beckman burners .. ..	1 set
Ring burner head for these .. ..	1 set
Landsberger's molecular weight determination apparatus ..	1 set
Thermo-regulator .. ..	1
Pocket Spectroscope, with comparison prism, illuminating mirror and adjustable slit .. ..	1
Spectrum tubes filled with Helium .. ..	1
Ditto ditto Argon .. ..	1
Solid formulae models, etc. .. ..	1 set
Stand for the above .. ..	2
Models, etc., complete set of 12 rubber-fittings 48 coloured bells, etc. .. ..	1 set
Copper gauze, 19 holes to an inch .. ..	2 sq. ft.
Filter paper washed with HCl and HF for quantitative work	
No. 589 (2) White ribbon, 9 cm. .. ..	500
11 cm. .. ..	100
(3) Blue ribbon 9 cm. .. ..	100
11 cm. .. ..	100
(4) Yellow ribbon 9 cm. .. ..	200

Reagents, etc., for Lecture work.

## C.—M.A. OR M.Sc. STANDARD

An additional supply of organic and rare inorganic substances will be necessary.

## ANTHROPOLOGY

## A.—INTERMEDIATE STANDARD

(a) *List of Apparatus for a Practical Class of 25 Students*

One articulated skeleton.  
Three sets of disarticulate bones.  
Von Luchan's skin colour chart—1.  
Martin's anthropometric set—1.

*Casts or photos or lantern slides of—*

Lemurs, Tarsius, Cercopithecus, Gibbon, Orang-outan, Chimpanzee, Gorilla and Pithecanthropus, Sinanthropus, Piltdown, Neanderthal, Cro-Magnon.

*Slides or photos of the following physical types—*

Europe—Nordic, Mediterranean, Alpine.  
Asia—Ainu, Japanese, Chinese, Tungus, Burmese, Malay, Andamanese, Veddahs, Baloch, Afghan, Iranian, Armenoid, Arab, Jew.

India—Kadir, Gond, Santhal, Khasi, Naga, Lepcha, Toda and at least one example each from a high caste and from the other castes from each of the following areas :—South India, Maharashtra, Rajputana, Gujrat, the Punjab, U. P. and Behar, Bengal, Assam, Orissa.

Africa—Egyptians, Berbers, Nilotes, Bantu, Bushmen, Pygmies of Central Africa.

Oceania—Melanesians, Australian, Polynesians.

America—Esquimaux, Plains Indians, Mayan, Peruvian, Patagonian, Tierra del Fuegian.

Casts or actual specimens of at least a Palaeolith and a Neolith.

*Photographs or models illustrative of material culture—*

Habitations (Pile dwellings, thatched huts, tiled huts, Malabar tiled huts).

Dress of any tribe of Assam and of Chota Nagpur.

Agricultural implements—digging sticks, hoes, ploughs.

Fishing-traps and nets.

Hunting-bows and arrows, spears and boomerang.

Potter's wheel, and specimens of wheel-made and hand-made pottery.

Primitive oil-press and the ordinary Kolhu.

Photographs illustrating ceremonials at birth, initiation, marriage and death in Bengal as well as some common festivals in Bengal.

(b) *Lecture-room Apparatus*

Projection lantern—1.

Charts showing (1) Geological ages; (2) Evolution of Man.

Photographs, illustrative of the life of primitive hunters and fishers, pastoral people and crude agriculturists.

Maps of physical features of all the continents and India.

A few fossils.

*Specimens for Study of Primitive Peoples of India***I. Agricultural implements :—**

A digging stick.  
 A garden spade.  
 A hoe.  
 A plough.

**II. Fishing implements :—**

A basket trap.  
 An automatic trap.  
 A fishing spear.  
 A hand net.  
 A cast net.  
 A drag net.

**III. Weapons of war and chase :—**

A club.  
 A spear.  
 Plain bow and pollet bow.  
 Arrow.  
 Bolt.

**B.—B.A. OR B.SC. STANDARD**  
*(Pass Course)*

**(a) List of Apparatus, etc., for a Practical Class of 12 Students**

*Additional requirements (in addition to the I.Sc. laboratory equipment).*

Two Martin's Anthropometric sets.  
 Fix-on Goniometer—1.  
 Weighing Machine—1.  
 Von Luschan's Skin colour scale.  
 Eye colour scale—1.  
 Hair colour scale—1.

**Casts or actual specimens of :—**

Macacus or Somnopithecus.  
 One of the anthropoid apes—Gibbon, Orang-outang, Chimpanzee or Gorilla.  
 Casts of :—Pithecanthropus, Sinanthropus, Pittedown, Heidelberg, Neanderthal, Cro-Magnon.  
 Casts and actual specimens of Stone implements :—Eoliths, Chellean, Achoulean, Mousterian, Aurignacian, Solutrean, Magdalenian, Azilian, Campiguan, Neolithic.  
 Casts or actual specimens or photos illustrative of Palaeolithic Art.

**Specimens or photos or slides illustrative of material culture :—**

- (A) *Agricultural implements* :—Digging stick, hoe, spade, pick, mattock, plough, roller, axo, harrow, rake, scythe and sickle, sowing instruments, threshing and cleaning appliances.  
 (B) *Hunting accessories* :—Traps, baits, nets.  
 (C) *Fishing appliances* :—Different types of nets and traps, dams and weirs, lines and tackle, spears and harpoons, etc.  
 (D) Different types of weapons of offence and defence.  
 (E) Different types of habitations.  
 (F) Types of dress and adornment showing method of wearing, technique of weaving, materials used and socio-political and magico-religious significance.

*(b) List of Lecture-room Requirements*

Charts illustrative of :—

- (a) Man's place amongst the mammals.
- (b) Vertebrate evolution.
- (c) Anatomical peculiarities of fossil anthropoids and men.

Photographs illustrative of the life of the primitive tribes prescribed for study.

Maps (or books containing them) illustrating the distribution of ethnic types in Europe and India.

Photos or illustrated books containing representation of manners and customs of primitive peoples.

## BIOLOGY

*Requirements for Affiliation in Biology up to the Intermediate Standard*

- (i) Charts for Botany portion of Biology .. ..
- (ii) Charts for Zoology portion of Biology .. ..
- (iii) Specimens for Botany portion of Biology .. ..
- (iv) Specimens for Zoology portion of Biology .. ..
- (v) Museum show case .. ..
- (vi) Models for Botany portion of Biology .. ..
- (vii) Models for Zoology portion of Biology .. ..
- (viii) Instruments for the teachers (for dissection, etc.) .. ..
- (ix) Stains, Cover Glass, Slides for teachers .. ..
- (x) Chemicals, reagents and preservatives .. ..
- (xi) Books on Botany, Biology and Zoology .. ..
- (xii) For a practical class of 20 students—
  - (a) Laboratory benches fitted up with sinks, taps and gas connections .. ..
  - (b) 10 Microscopes .. ..
  - (c) 10 Mounted magnifying glasses .. ..
  - (d) 20 Dissecting trays .. ..

*Requirements for Affiliation in Biology up to the Intermediate Standard for Colleges already affiliated in Botany*

(N.B.—The requirements are applicable only to such colleges as have the teaching staff in Botany, of sufficient strength for teaching Botany portion of Biology in addition to their duties as teachers of Botany. The practical class room of Botany should be available for conducting practical classes in Biology.)

- (i) Charts for Zoology portion of Biology .. ..
- (ii) Specimens for Zoology portion of Biology .. ..
- (iii) Museum show case .. ..
- (iv) Instruments for the teacher (for dissection) .. ..
- (v) Models for Zoology portion of Biology .. ..
- (vi) Stains, cover slip and slides for the teacher .. ..
- (vii) Chemicals and reagents for preservation, etc. .. ..
- (viii) Books on Biology and Zoology .. ..



- (ix) For a practical class of 20 students—  
 (a) Laboratory benches (practical class in Botany will serve the purpose).  
 (b) 10 Microscopes (available from Botanical Laboratory).  
 (c) Dissecting trays            ..            ..            ..

*Requirements for Affiliation in Biology up to the Intermediate Standard for Colleges already affiliated in Zoology*

(N.B.—The requirements are applicable only to such colleges as have the teaching staff in Zoology, of sufficient strength for teaching Zoology portion of Biology in addition to their duties as teachers of Zoology. The practical class room of Zoology should be available for conducting in Biology.)

- (i) Charts for Botany portion of Biology            ..            ..  
 (ii) Specimens for Botany portion of Biology            ..            ..  
 (iii) Museum show case            ..            ..  
 (iv) Models for Botany portion of Biology            ..            ..  
 (v) Stains, cover slips, slides for the teacher            ..            ..  
 (vi) Chemicals and reagents            ..            ..  
 (vii) Books on Biology and Botany            ..            ..  
 (viii) For a practical class of 20 students—  
 (a) Laboratory benches (practical class in Zoology will serve the purpose).  
 (b) 10 Microscopes (available from the Zoological Laboratory).  
 (c) 10 Mounted magnifying glasses            ..            ..
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## APPENDIX D

### LIST OF APPLIANCES IN DIFFERENT SUBJECTS FOR THE MATRICULATION EXAMINATION

#### GEOGRAPHY

##### *List of Appliances for teaching Geography*

- (1) Clay, dry sand, paper pulp for modelling.
- (2) A Globe not less than 12 inches in diameter.
- (3) A Map of the School Locality and a Map of the area under the local Thana (these two maps may be prepared by the Geography teacher).
- (4) A Map of the District in which the school is situated (scale 1" = mile).
- (5) A Coloured Map of the Province.
- (6) A Coloured Political Map of India.
- (7) A Physical Map of India.
- (8) An Outline Map of India for map-building purpose (on a black cloth mounted on rollers).
- (9) A Map of the World on Mollweide's equal area projection.
- (10) A Political Map of each of the continents.
- (11) A good standard Atlas.
- (12) A Rain-gauge.
- (13) Geographical pictures.
- (14) A small collection of typical rocks, in particular, those of the Province and India.
- (15) A small collection of typical products of the Province and India.

*N.B.*—(a) Nos. 14 and 15 can be collected slowly with the help of the students and the teachers.

(b) Measuring tape, meter scale, foot-rule, squared paper, magnetic compass, thermometers and barometer have not been included in the list as these articles will be purchased by all schools in connection with equipping the class-room for teaching Elementary Scientific Knowledge.

The following additional equipment is recommended when it can be provided, but the lack of it is not to be considered as a bar to the recognition of the school—

- (1) A Relief Map of India.
- (2) A Physical Map of India (Johnston or Philip).
- (3) A Physical Map of each of the Continents (Johnston or Philip).
- (4) A Map of the World showing ocean-currents.
- (5) A Railway and Road Map of India (to be collected from Railway Time-tables).
- (6) Maps of India showing (i) Isotherms, (ii) Rainfall, (iii) Animals and (iv) Vegetation.
- (7) Charts explaining (i) tides and (ii) change of seasons.
- (8) Weather-cock or Windvane.

A Magic Lantern with slides will be useful. This will also be useful for the teaching of Elementary Scientific Knowledge.

## ELEMENTARY SCIENTIFIC KNOWLEDGE

*List of Apparatus required for teaching Elementary Scientific Knowledge in High Schools recognised by the University of Calcutta.*

## 1 and 2. Physiography.

(See the list of apparatus for teaching Geography in High Schools. A collection of rocks and minerals is essential.)

## 3. Elementary Botany and Biology—

## Morphological Charts.

(1)	Chart showing different kinds of	Roots	..	1
(2)	"	"	"	1
(3)	"	"	Leaves	.. 1
(4)	"	"	Flowers	.. 1
(5)	"	"	Fruits	.. 1
(6)	Chart showing the different parts of	Rice Plant		1
(7)	Chart showing the different parts of	Pea Plant		1
(8)	Chart showing the life-history of	Ant	..	1
(9)	"	Bee	..	1
(10)	"	Spider	..	1
(11)	"	Mosquito	..	1
(12)	"	Butterfly	..	1
(13)	"	Frog	..	1
(14)	Chart showing the anatomy of	Earth-worm		1
(15)	Chart showing the life-history of	Fish	..	1

*Note.*—Experiments on respiration, assimilation and transpiration of plants can be shown by apparatus suggested for Physics and Chemistry part of the Syllabus.

## 4. Elementary Anatomy and Physiology—

(1)	Chart showing the	Skeleton System	..	1
(2)	"	the Muscular System	..	1
(3)	"	the Circulatory System	..	1
(4)	"	the Respiratory System	..	1
(5)	"	the Digestive System	..	1
(6)	"	the Nervous System	..	1
(7)	"	the Structure of the Skin	..	1

## 5 &amp; 6. Elementary Physics and Chemistry—

Ruler	Boxwood, 1 metre long, 1/10th of an inch on one edge and mm. & cm. on the other.	1	only
Measuring cylinders	(one graduated in cub. in. and the other in c.c.).	2	"
Balance,	all purposes, 250 gm. cap. with sp. gr. stool or extra short pan, sensitivity 3.4 mgrs.	1	"
Weight Box	in hard wood box, 1 to 100 grms., with fractional weights	1	"
Level of Water.	Apparatus to show, of glass, with 5 branches	1	"

Spouting cylinder to show liquid pressure at different depths	1 only
Apparatus to show Archimedes' Principle, Bucket and Cylinder	1 "
Glass Syringe .. .. .	1 "
Spirit Level .. .. .	1 "
Barometer Syphon, fitted with mercury ..	1 "
or	
{ Barometer Tubes .. .. .	2 "
{ Trough 2" diam. for the above .. .. .	2 "
{ Funnel (very small for the Barometer tube) ..	2 "
{ Mercury .. .. .	1 lb.
Expansion, Cubical, Gravesand's Ball and Ring ..	1 only
Wall Thermometer, double scale, Centigrade and Fahrenheit, of wood	1 "
Conduction of Solids (different metals)—Ingehausz's Apparatus	1 "
Ventilation Apparatus; Wooden box with two openings on top over which chimneys are placed (can be made to order)	1 "
Drawing Board to be covered with white paper (for Reflection and Refraction Expts.—can be made to order)	1 "
Drawing-Board Pins for the above .. .. .	6 "
Hair Pin with white knob .. .. .	1 doz.
Prism glass equilateral length 75 mm., sides 38 mm.	1 only
Slit of zinc sheet 4" sq. on stand .. .. .	1 "
Screen 6' x 4' of zinc on stand .. .. .	1 "
Lens, concave and convex (one each), with one wooden holder, Focal length 26 cm. diam. 50 mm.	1 set
Magnifier, triple power, in horn mount 30 mm. ..	1 only
Candle-holder, adjustable .. .. .	1 "
Lodestone, small in paper box .. .. .	1 "
Magnet Bar 6" x $\frac{3}{4}$ .. .. .	1 "
Horse-shoe magnet 2" .. .. .	1 "
Iron Filings .. .. .	1 lb.
Magnetic Needle 2", brass-centre on pivot on wooden base	1 only
Compass Needle .. .. .	1 "
Stirrup Suspender .. .. .	1 "
Knitting Needle, steel, for magnetisation ..	1 doz.
Ebonite Rod 6" long .. .. .	2 only
Silk piece .. .. .	1 "
Flannel piece .. .. .	1 "
Simple Electric cell, made up of outer glass vessel and 2 plates, one of copper and another of zinc, with binding screws	1 set
Leclanché cell, porous pot, charged, zinc rod, 1 lb. ammon. chloride, complete with outer glass vessel 2 pints	3 only
Electromagnet (with armature and connecting screws)	1 "
Electric Bell, 2" gong with push key .. .. .	1 "
Connecting wire D. C. C. No. 22 .. .. .	1 "
Apparatus to show Electrolysis of water ..	1 "

Torch, three-celled, with 3 cells .. ..	1 only
Apparatus to show the heating effect of current, containing wooden base, copper, connector, binding screws and platinum wire 3', 0.19 mm. diam.	1 "
Spirit Lamp, glass, complete with wick and holder 120 c.c.	2 "
Tripod, Iron, 15 cm. high 4" top .. ..	2 "
Wire gauge, iron 20 mesh, 13 cm. sq. .. ..	3 "
Retort stand, 20' rod with retort ring .. ..	1 set
Clamp, retort with right-hand and left-hand screws	1 only
Condenser Clamp, cheap .. ..	1 "
Glass rod 3-6 mm. diam. .. ..	$\frac{1}{2}$ lb.
Glass tubing, 3-7 mm. bore .. ..	1 lb.
File (Triangular and Rat-tail, 1 each) .. ..	2 only
I. R. tubing 5/16', 3/16" and 3/8" .. ..	4 ft. each
Cork, vulvot, assorted, 12, 14, 18, 21, 24 and 28 mm. diam.	$\frac{1}{2}$ gross
Cork-borer, nickelled brass, without handle, but with rod, set of 6	1 only
Test-tube, glass, 5" $\times$ $\frac{3}{8}$ " in card-board box .. ..	2 doz.
Test-tube brush .. ..	3 only
Test-tube stand, teakwood, 12 holes in 2 rows .. ..	1 "
Test-tube, Lamp, blown kav-Boh, hard glass, 7' $\times$ $\frac{1}{2}$ "	3 "
Beaker with spout (100, 200, 250 c.c., 1 each) .. ..	1 set
Beaker without spout for boiling (100, 200, 250 c.c., one each)	1 "
Flask R. B. (125, 250, 500 c.c., one each) .. ..	1 "
Flask F. B. (125, 250, 500 c.c., one each) .. ..	1 "
Evaporating Basin, S.C.P., porcelain, 10 cm. with spout .. ..	2 only
Glass tumblers (medium size) .. ..	3 "
Funnel Glass 7 $\frac{1}{2}$ ' cm. diam. .. ..	1 "
" " 10 cm. diam. .. ..	1 "
Pneumatic trough, 24 $\times$ 12 cm. .. ..	1 "

or

Enamel Bowl .. ..	1 "
Bell-jar with stopper 8" $\times$ 5" .. ..	1 "
Gas jar with ground-glass cover (8" $\times$ 2')	3 "
Beehive shelf .. ..	1 "
Watch glass, 6 cm. diam. .. ..	2 pairs
Condenser, Liebig's, I.R. joint 30 cm. .. ..	2 only
Woulf's bottle, complete with thistle funnel, delivery tube and cork, 200 and 500 c.c., one each	2 "
Deflagrating spoon .. ..	1 "
Bottle, Reagent, W.M.S., 60 c.c. .. ..	6 "
Bottle, Reagent, N.M.S., 125 c.c. .. ..	6 "
Filter Paper, C.S. and S. No. 595, qualitative, 9 cm. diam.	1 pkt. (100 sheets)
Litmus Paper (blue and red, one pkt. each) .. ..	2 pkts.
Candle .. ..	2 only
Magnesium ribbon, 1 $\frac{1}{2}$ oz. in a phial .. ..	1 phial
Sulphur Roll in tin .. ..	$\frac{1}{2}$ lb.
Paraffin, hard .. ..	1 "
Potass. Chlorate coml. in bottle .. ..	8 oz.
Manganese dioxide 80 per cent. in bottle .. ..	8 oz.

Zinc granular in bottle .. .. .	4 oz.
Alum Potash in bottle .. .. .	4 oz.
Pot. Permanganate .. .. .	2 oz.
Copper Sulphate pure, crystal, in bottle .. .. .	4 oz.
Carbon Bisulphide, P.B. .. .. .	1 lb.
Caustic Soda in bottle .. .. .	$\frac{1}{2}$ lb.
Sodium carbonate .. .. .	1 lb.
Sulphuric Acid coml. S. G. 1740 in a glass stopd. bottle	1 lb.
Hydrochloric Acid coml., S. G. 1145-50, in a glass-stopd. bottle	1 lb.
Nitric Acid Pure, S. G. 1380, in a glass stopd. bottle	1 lb.
Copper Turnings in bottle .. .. .	8 oz.
Marble chips in tin .. .. .	1 lb.
Lime in tin .. .. .	1 lb.
Common Salt in bottle .. .. .	4 oz.

Each school may purchase the following additional apparatus :—

One Microscope or a Magic Lantern with slide† ..	
Dissecting tray .. .. .	1 only
Sscalpel, fine point forceps and scissors with 6 pins ..	1 set
Primus stove with inclined burner for glass blowing, soldering, etc.	1 only

## ELEMENTARY MECHANICS

### *List of Appliances for teaching Elementary Mechanics*

Foot-rule and a measuring tape.  
 Plumb-line and level.  
 Simple level (including brass slotted weight).  
 Roman Steelyard.  
 Lecture apparatus for experiment on moments.  
 Atwood's Machine.  
 Stop-watch.  
 Glazebrooke's Apparatus (to demonstrate movement of a body).  
 Hick's ballistic balance.  
 Compound wheel and axle.  
 Double pulley in one row.  
 4 single brass pulleys and 2 triple brass pulleys.  
 Weston differential pulley blocks with chain ( $\frac{1}{4}$  ton).  
 Inclined plane.  
 Parallelogram of Forces apparatus.  
 Resolution of Forces apparatus.  
 Wall Crane.  
 Physical Balance, with extra scale pan.  
 Set of gramme weights (200 grammes to 1 mgr.).

2 Composition ivory balls.

Apparatus to show the path of projectile.

Cardboard discs.

Geometrical models of different shapes (including a cone).

*Note.*—The above list is not exhaustive, and much of it might be replaced by similar forms that could probably be made far more cheaply by any clever *mistry* under proper supervision. In most cases, however, it will probably be found advantageous to buy such a set as indicated in the list specially for demonstrating purposes, at a cost of about Rs. 400 and subsequently to develop simplified duplicates illustrating the same principles which the boys should be given opportunity actually to experiment with, on their own individual account or working in pairs.

### ELEMENTARY HYGIENE

*The schools which apply for recognition in Hygiene are required to provide the following Appliances :*

#### A. CHARTS

1. A. L. Physiology and Hygiene charts, complete set.
2. A thermometric chart showing normal scale of effective temperatures.
3. Common intestinal parasites.
4. Common bacilli.
5. Deep-well, shallow-well, tube-well.
6. Reserved tank.
7. Vitamin contents of common food-stuffs.
8. Code of sportsmanship.
9. Different types of Mosquitoes (Anopheles, Culex, Stogomyia).  
Different varieties of Flies (house fly, stable fly, blue-bottle).
10. Fleas (common flea, rat flea, sand flea), Lice (head, body and crab).
11. Life-history of a mosquito.
12. Life-history of a house-fly.
13. List of health practices.
14. Different types of exercise and their effects upon the body.
15. Different types of postures.
16. Different provisions for ventilation.
17. Slow sand-filter.
18. Private latrine; pit latrine; bore-hole latrine; night-soil cart.
19. Complete system of house drainage.
20. Section of percolating sewage filter (balanced filter).
21. Septic tank.
22. Black-board cloth on rollers for recording changes in height and weight of students.

#### B. APPARATUS

- \*1. Students' microscope.
- \*2. Bell-jars—2.
- \*3. Glass Plates—2.
- \*4. Dish Plates—2.
5. Glass Tube.
6. Mirror.
7. Candles.

8. Lengths of wire.
9. Slides.
10. Cover slips.
11. A pair of compasses.
12. A foot-rule marked in mm.
- \*13. A stop-watch.
14. Mounted needles—2.
- \*15. Beakers—3, 250 c.c.
16. A metal ring.
- \*17. A set of six test-tubes—4.
- \*18. Test-tube stand—1.
- \*19. Test-tube holders—2.
20. Water-bath—6 ft.
21. Pieces of rubber.
22. A rubber tube—4 ft.
23. Glass beads—12.
24. Spirit lamp.
25. Spirit stove.
26. A weighing machine.
27. A height-measuring rod.
28. A steel tape.
- \*29. A dry-bulb thermometer. } Preferably Fahrenheit.
- \*30. A wet-bulb thermometer. }
- \*31. A chemical thermometer, Centigrade.
32. A clinical thermometer.
- \*33. A mercurial barometer.
- \*34. A lactometer.
- \*35. Liebig's condenser with accessories.
36. Glass funnel.

## C. CHEMICALS, ETC.

- \*1. Lime water—1 lb.
- \*2. Absolute Alcohol—4 oz.
- \*3. Xylol—1 oz.
4. Vaseline—1 lb.
5. Boric Cotton—4 oz.
6. Starch—1 oz.
7. Pepsin—1 oz.
8. Gelatin—1 oz.
9. Iodine, Sol.—2 oz.
10. Benedict's Solution, or Fehling's Solution—2 oz.
- \*11. Acid Hydrochlor, Dil.—2 oz.
- \*12. Litmus paper, red and blue (4 packets).
13. Sugar.
- \*14. Filter paper.
15. Alum.

*Note.*—Apparatus and chemicals marked with asterisks will also be required for the purpose of teaching Elementary Scientific Knowledge as a compulsory subject. They need not be purchased twice over separately.

## D. SPECIMENS

## (a) Food.

- (i) Different kinds of rice.
- (ii) Different kinds of dal (pulses).
- (iii) Different kinds of other cereals—Wheat, Barley, Indian Corn, Indian Oats, Jawar, etc.



- (iv) Different kinds of sugar.
  - (v) Different oil-producing substances—linseed, mustard seed, cocoanut, groundnut, sorgoja, mohua seeds, til, etc.
- (b) Antiseptics or Disinfectants.
- (i) Bleaching powder.
  - (ii) Permanganate of potassium.
  - (iii) Sulphur.
  - (iv) Phenyle.
  - (v) Soap, common and carbolic.

*Probable amount of Expenses for procuring Appliances necessary for recognition  
in Elementary Hygiene*

	Rs.
I. Apparatus (this includes cost of apparatus which will also be required for compulsory classes in Elementary Scientific Knowledge to the extent of nearly Rs. 125). . . . .	250
II. Specimens (approx.). . . . .	10
III. Charts—	
(a) A. L. Physiology and Hygiene charts, complete set— Rs. 12-8-0.	105
(b) Black-board cloth on roller—Rs. 2-8	
*(c) 20 charts at an approx. cost of Rs. 4-8-0 each— Rs. 90.	
IV. Chemicals (recurring) . . . . .	5 to 10
Total . .	375
Less Rs. 125 required for compulsory class in Elementary Scientific Knowledge. . . . .	125
	250

### BUSINESS METHOD AND CORRESPONDENCE

*List of Appliances for teaching Business Method and Correspondence*

1. Facsimiles of principal commercial instruments.
2. Specimen pages of principal books used in a modern office.
3. Small model of a filing cabinet with card index.
4. Small model of a duplicating machine and of an addressograph.
5. Organisation charts for (a) offices and (b) factories.
6. Postal Guide.
7. Any Good Directory, e.g., Thacker's.
8. Any good Commercial Code, e.g., Bentley's
9. Telephone Directory.
10. Also books on Business Methods and Correspondence and Allied subjects to the value of Rs. 60 in the School Library.

\*Some of the charts may be prepared by the schools locally at a considerably reduced cost.

## COMMERCIAL GEOGRAPHY

*List of Appliances for teaching Commercial Geography*

- One Terrestrial Globe, not less than 8" in diameter, with meridians.
- A Commercial Map of the world such as Philip's New Mercantile Map of the World (Mercator's Projection).
- Any good commercial Atlas such as Philip's Chamber of Commerce Atlas.
- Geographical pictures such as Black's Geography Pictures.
- Crop Atlas of India (Govt. of India) .. ..
- Historical Atlas of India, such as that published by Messrs. Longmans, Green and Co.
- Economic Wall Maps of India, showing Railways and Canals.
- Map of India showing Industries .. ..
- " " " Populations .. ..
- " " " Civil Divisions .. ..
- " " " Rainfall and Temperature .. ..
- " " " Forests .. ..
- " " " Minerals .. ..
- " " " Agriculture .. ..
- A small commercial museum containing chief minerals and economic products of India with suitable statistical charts and diagrams.
- Books and Atlases on general and commercial geography in the school library.

## ELEMENTS OF PHYSICS AND CHEMISTRY

*List of Appliances for teaching Elementary Physics and Chemistry*

(Appliances in this list are in addition to those required for teaching Elementary Scientific Knowledge).

*1. Elements of Physics*

- |  |        |
|--|--------|
| Ruler, Boxwood, 1 metre long, 10ths of an inch on one edge and cm. and mm. on the other.         | 1 only |
| Protractor, Wooden .. ..   | 1 "    |
| Set of 6 Hard Wood Blocks, 1½" high, comprising Cone, Cube, Sphere, Pyramid, Cylinder and Prism. | 1 set  |

Measuring Cylinder, glass, one graduated in cubic inches and the other in cubic centimetres.	2 only
Spring Balance, reading in grms. up to 50 grms. . .	1 „
Air Pump with plate of 6" diam. . .	1 „
Thermometers (one having Centigrade scale from 0° to 110° and the other Fahrenheit scale from 0° to 220°).	2 „
Apparatus for showing convection of heat in water in a glass rectangle with funnel.	1 „
Ritchie's Apparatus for showing absorption and radiation of heat.	1 „
Calorimeter, Schuster and Lees' . . . . .	1 „
Tuning Fork, simple C. A. G. . . . .	1 each
Resonance Apparatus ; glass jar and glass tube with metal stand.	1 only
Electric Bell in Bell-jar . . . . .	1 „
Rectilinear Propagation of Light Apparatus with triple candle holder and two screens.	1 „
Photometer, Bunsen's . . . . .	1 „
Angular mirrors, two hinged together, mounted on wooden base with paper scale.	1 „
Student's Optical Bench with accessories . .	1 „
Concave Mirror, optically true, diam. 2" . .	1 „
Convex Mirror, optically true, diam. 2" . .	1 „
Muller's Semi-circular tray, for Reflection, made of japanned tin with revolving mirror, indicator and divided circle ; diam. 18".	1 „
Refraction of Light, glass slab to show, polished on all sides.	2 „
Prism, glass, equilateral length 75 mm., face 38 mm.	2 „
Drawing Board for Refraction experiment . .	1 „
Lens, double convex, diam. 50 mm., focal length 26 cm.	1 „
Lens, double concave, diam. 50 mm., focal length 26 cm.	1 „
Bar Magnet, 4" long . . . . .	1 pair
Glass, Ebonite, Sealing wax and Sulphur Rod, 1 each	4 only
Flannel for rubbing . . . . .	1 piece
Silk for rubbing . . . . .	1 „
Catskin for rubbing . . . . .	1 „
Pit Balls in box . . . . .	1 doz.
Pit Ball Pendulum . . . . .	1 only
Electroscope, Gold leaf . . . . .	1 „
Induction cylinder ; brass cylinder mounted on an insulated stand, with mounted pit balls.	1 „
Electrophorus : ebonite base with glass handle fixed to brass cover, 4" diam.	1 „
Daniell's cell, complete with outer copper cell, porous pot, zinc rod, 1 lb. copper sulphate, 1 pint capacity.	1 „
Dilute Sulphuric Acid . . . . .	2 lbs.
Galvanoscope, horizontal, paper scale and coil of about 20 turns of insulated wire, with terminals.	1 only
Demonstration Telegraph Apparatus . . . . .	1 set

2. *Elements of Chemistry*

Test tubes, glass, 5" x 3/4" .. .. .	1/2 gross only
Test tubes, Pyrex combustion glass 6" x 3/4" .. .. .	3 only
Test tube holder, flat brass with slider .. .. .	" "
Crucible tongs, brass, 8" .. .. .	1 "
Pneumatic trough, enamelled metal, with side shelf and movable beehive shelf (14" x 8" x 6") .. .. .	1 "
Test tube stand, teak wood, 12 holes in 2 rows .. .. .	1 "
Beaker with or without spout, hard glass (100, 150, 250 c.c., one each).	3 "
Flask, flat bottom, hard glass (100, 250, 500 c.c., one each).	3 "
Flask, round bottom, hard glass (100, 250 cc., one each).	2 "
Evaporating Basin, Porcelain, 8 cm. with spout .. .. .	2 "
Glass tubing, 3—7 mm. bore .. .. .	1 lb.
Mortar and Pestle, Porcelain, with spout .. .. .	1 only
Sulphur Roll (Pkt.) .. .. .	1 lb.
Iron Filings (Pkt.) .. .. .	1 lb.
Potassium Nitrate coml. (Pkt.) .. .. .	2 lbs.
Sodium Chloride cryst., P. B. .. .. .	1/2 lb.
Sugar cryst. .. .. .	3/4 "
Iodine, P. B. .. .. .	1 oz.
Carbon Bisulphide .. .. .	4 "
Potassium Iodine cryst. .. .. .	2 "
Rectified spirit .. .. .	4 "
Ether Sulphuric, P. B. .. .. .	2 "
Alum Potas, Extra Pure Cryst. .. .. .	4 "
Camphor (in tin) .. .. .	1 "
Boric Acid .. .. .	1/2 lb.
Graphite Powder (Pkt.) .. .. .	2 oz.
Charcoal, Animal (Pkt.) .. .. .	4 "
Sodium Metal .. .. .	2 "
Phosphorus, Yellow Sticks .. .. .	2 "
Copper Sulphate (Pkt.) .. .. .	2 lbs.
Potas. Chloride coml. in bottle .. .. .	8 oz.
Manganese dioxide in bottle .. .. .	8 "
Ammonium Chloride (Pkt.) .. .. .	1 lb.
Iron Ore, Magnetic .. .. .	4 oz.
Rods of Cast iron, Steel and Wrought iron, 12" one each.	3 only
Iron Oxide Black (Ferrous) .. .. .	2 oz.
Iron Oxide Red (Ferric) .. .. .	2 "
Iron Chloride Dry (Ferrous) .. .. .	2 "
Iron Chloride Dry (Ferric) .. .. .	2 "
Iron Sulphate (Ferric) .. .. .	2 "
Iron Sulphate (Ferrous) .. .. .	1 lb.
Iron Sulphide .. .. .	1 "
Magnesium Ribbon (Pkt.) .. .. .	12 gms.
Platinum Wire, 4" .. .. .	1 piece
Magnesium Carbonate coml. .. .. .	1 lb.
Magnesium Chloride Lump .. .. .	1 "
Magnesium Sulphate .. .. .	1 "
Cinnabar .. .. .	2 oz.

Mercuric Oxide Red	..	..	2 oz.
Mercurous Chloride (Calomel)	..	..	2 "
Mercuric Chloride (Corrosive Sublimate)	..	..	2 "
Mercuric Sulphide, Red Powder	..	..	2 "
Zinc Blende	..	..	4 "
Zinc Metal, Granular (Pkt.)	..	..	1 lb.
Zinc Oxide (Pkt.)	..	..	1 "
Zinc Chloride Lump	..	..	1 "
Zinc Sulphate	..	..	2 lbs.
Zinc Carbonate coml. (Pkt.)	..	..	$\frac{1}{2}$ lb.
Zinc Sulphide	..	..	4 oz.
Ammonium Chloride (Pkt.)	..	..	1 lb.
Potassium Nitrite	..	..	$\frac{1}{2}$ "
Acid Nitric coml.	..	..	1 "
Acid Hydrochloric coml.	..	..	1 "
Acid Sulphuric coml.	..	..	1 "
Caustic Soda Flakes	..	..	1 "
Caustic Potash Flakes	..	..	1 "

*N.B.*—(i) Each school should provide a minimum sum of Rs. 30 per annum as recurring expenditure for Apparatus and Chemicals.

(ii) Each school should, if possible, provide the following apparatus at a cost of about Rs. 10 :—

- (a) One Measuring flask, 250 c.c.
- (b) One separating funnel, 250 c.c.
- (c) One graduated pipette, 10 c.c. or 5 c.c.
- (d) One burette, 50 c.c.

The above articles, viz., (a), (b), (c) and (d) can be purchased in the first or second year from the allotment of Rs. 30 mentioned above.

## MENSURATION AND SURVEYING

### *List of Appliances for teaching Mensuration and Surveying*

- 1 Instrument box containing 1 pair divider, 1 compass with plain, pencil and ink points.
- 1 pencil bow compass, 1 ink bow compass, 1 drawing pen, 1 protractor and 1 parallel ruler.
- Best quality Electrum .. ..
- 1 pair set squares (transparent 6'-45° and 8'-60° ..
- 1 box of plotting scales 10 to 60 with offsets ..
- 1 Measuring chain 100' with 10 arrows ..
- 1 Cross staff or optical square .. ..
- 1 Metallic tape 50' .. ..
- 6 Flags of light bamboos shod with iron ..
- Field books (number as necessary) ..

## ELEMENTS OF BIOLOGY

*List of Appliances for teaching Biology*

One Compound Microscope . .  
 Two Dissecting lenses on stand  
 20 Dissecting dishes with paraffin  
 Charts . . . . .  
 Preservative fluid . . . . .  
 Glasswares to keep specimens

## SEWING AND NEEDLEWORK

*List of Appliances for teaching Sewing and Needlework*

1. A sewing machine . . . . .
2. Different kinds of books and current publications on embroidery, crochet, drawn thread, knitting, net-work, cross-stitch, cutting and pattern making
3. One big and one small scissors . .

*Prepared works.*

## A.

- (1) *A Child's frock* (6-20 years)—any light-coloured cotton cloth—2 yds.  
*A petticoat* (bodice and princess style)  
 Long cloth—2 yds.

- (2) *A child's overall, cut and embroidered*  
 —Any light-coloured cotton cloth  
 —2 yds.

Silk thread 2 Skeins . . . . .

- (3) *A Magyar bodice*—Long cloth  $\frac{3}{4}$  yd.  
*A blouse*—Any light-coloured cotton  
 1 yd.

*A petticoat*—Long cloth  $1\frac{1}{2}$  yds. . .

- (4) *A Shirt*—Long cloth  $1\frac{1}{2}$  yds. . .
- (5) *A knitted suit for a child (including cap)*

*Wool	8 oz.
Buttons (big)	6
Buttons (small)	4
Knitting needles	4

- (6) *A pair of knitted socks on 4 needles*  
 Steel needles  
 Wool 2 oz.

\*(*Vide* Syndicate, dated the 18th September, 1942, item No. 9).

- (7) *A patch in a garment made of cotton, silk and flannel.*

Old garment and pieces of flannel, silk and cotton may be brought by the students. No expenditure.

- (8) *Darning, repairing a hole*—Old garments may be brought by the students.

Darning Cotton and Needle

For the above 8 items scissors, 2 cotton reels, sewing needle and a carpet needle will be needed.

B.

To show "*kantha*" stitch, a baby's *kantha* may be made with old cotton and threads taken out of borders of old *saris*.

The other stitches may be shown on different items mentioned under A.

*If they are shown on sample—*

Cotton cloth ..

Silk threads, 3 skeins ..

*Fancy work on net—*

Net ..

Silk threads, 2 skeins ..

*Zari work—*

Velvet  $\frac{1}{2}$  yd. ..

Zari  $\frac{1}{2}$  tola ..

*Pillow-case corner—*

Long cloth 1 yd. ..

A frame for drawn-thread work

Silk threads, 2 skeins ..

Crochet cotton, 1 ball ..

Crochet needle, 1 ..

One very sharp-pointed small scissors

For applique work pieces of cloths of different colours may be brought by the students.

## MUSIC

### *List of Appliances for teaching Music*

#### *Indian Music*

- |    |                   |    |    |
|----|-------------------|----|----|
| 1. | One Tanpura       | .. | .. |
| 2. | One box Harmonium | .. | .. |
| 3. | One pair Tabla    | .. | .. |

4.	One Pakhoaj	..	..	..
5.	One Khol	..	..	..
6.	One Esraj	..	..	..
7.	One Sitar	..	..	..
8.	One Violin	..	..	..
9.	Books on music for library	..	..	..
10.	Furniture	..	..	..

*Western Music*

11. Pianoforte.

## DOMESTIC SCIENCE INCLUDING DOMESTIC HYGIENE

*List of Appliances for teaching Domestic Science including Domestic Hygiene*  
 Table—5'-6" long 4 ft. wide for the Teacher for Demonstration purposes.  
 Black-Board.

*Ovens*—2 girls to one washing sink.

*Cooking Utensils.*

*Measuring Cups and Measuring Spoons.*

*Spoons*—a set of 6, of different measurements.

*Individual Spoons for cooking purpose*—Ditto for each of three girls.

*Knives, Sieves.*

*Rolling Board and Pins.*

*Jharans for dusting and wiping utensils.*

*Plates, Cups, Saucers, Tumblers for dining.*

*Lockers*—2 girls to one for keeping utensils, etc.

*Stools*—for students to sit on rather than desks and benches.

*Aprons for students to wear during cooking class.*

*Laundry*—Washing sinks, mangle, table for ironing, irons (2).

*String and pegs*—for clothes and blankets for ironing Board.

*Cupboard*—for keeping goods for the class in general.

Large washing sinks for general washing.

A set of charts and pictures for demonstrational purpose (composition of vegetables, meats, eggs, fish, fruits, etc.).

*Bed*—to make bed for the home and for a patient, mattresses, sheets.

*A crib or basket*—for a baby.

*Mattress, Pillow, Washing Tub Towel.*

A model house—plan showing the ideal arrangements of rooms, latrines, out-house, etc. (This may be made in the School.)

A simple apparatus to demonstrate the principles of ventilation (already included in the list of appliances for Elem. Sc. Knowledge).

A set of charts, illustrating germs, bacilli and other carriers of diseases.

A quantity of soda, blue starch, *Ritha* for laundry work.

Samples of cotton, wool, silk.

Charts showing the structure of the human body and the functions of the different organs thereof (already included in the list of appliances for Elem. Sc. Knowledge).

Thermometer and squared paper to make Temperature chart for Doctor's use and for keeping other records.

Measure-glass, Feeding cups, Syringe, Ice-bag.

A set of First-aid appliances: Thinct. Iodine, Benzine, bandages, cotton, etc.

Powdered rice and coloured flour for *alpana*.

*Dhup, Dhuna, Sulphur, Bleaching Powder, Phenyle, etc., for clearing.*



## DRAWING AND PAINTING INCLUDING AN APPRECIATION OF FINE ARTS

*List of Appliances for teaching Drawing and Painting including an Appreciation of Fine Arts*

I. For the Theoretical Course for developing appreciation and understanding of the Fine Arts the following illustrative materials or such of them as may be available for study are prescribed :—

## 1. PAINTING.

- (a) Colour Post Cards published by the National Gallery, London—
  - No. 1007 : Bellini : Portrait of Doge Loredano.
  - No. 1003 : Hobbema : The Avenue.
  - No. 1072 : El Greco : The Agony in the Garden.
  - No. 1082 : Sassoferrato : Madonna in Prayer.
  - No. 1004 : Perugino : The Virgin Adoring.
  - No. 1024 : Rubens : " Chapeau de Paillé."
  - No. 1925 : Turner : The Fighting Temeraire.
  - No. 1089 : Hogarth : The Shrimp Girl.
  - No. 1075 : Botticelli : Madonna and Child.
  - No. 1008 : Vermeer : A Lady at the Virginals.
  - No. 1098 : Leonardo Vinci : The Virgin of the Rocks.
  - No. 1081 : Rembrandt : Portrait of F. V. Wasserhoven.
  - No. 1054 : Corot : The Bent Tree. Price two pence each.
- Colour Post Cards published by the Medici Society, London.
- (b) No. 14 : Fra Angelico : The Annunciation.
- No. 108 : Leonardo Vinci : Mona Lisa.
- No. 2 : Leonardo Vinci : Head of Christ.
- No. 129 : Raphael : Madonna della Sedia.
- No. 105 : Filipino Lippi : An Angel Adoring.
- No. 101 : Holbein : Georg Gisze.
- No. 155 : Vermeer : Girl at the Casement.
- No. 47 : Rossetti : The Annunciation. Price two pence each.
- (c) Published by F. Hodfstaengl, Munich :
  - No. 143 : Pieta School of Avegnon.
  - No. 13 : Van Gogh : The Sunflower.
- (d) British Museum series of Coloured Post Cards.
  - (1) Set B4 : Japanese Colour Prints.
  - (2) Set B46 : Mughal Painters of the early 17th century.
  - (3) Set B33 : Indian Painting, Buddhist and Rajput Schools.

Price one shilling per set

## 2. SCULPTURE.

- (1) Post Card No. XCVIII : Classical Greek Sculpture, published by the British Museum, London. Price one shilling.
- (2) A Picture Book of Gothic Sculpture, published by Victoria Albert Museum, London. Price six pence.
- (3) A special set of Post Cards of India, Indonesian and Chinese Sculpture, to be issued by Mr. O. C. Gangoly. Price 8 as.

*In studying these examples of masterpieces, emphasis should be laid on the quality of their colour, composition and form and not on their subject-matter or their authors or their lives.*

II. For the Practical Course the following Drawing Books are recommended :—

- (a) Bengali Students' Drawing Books by E. B. Havell, Books I, II, III (Macmillan & Co.) (optional).
- (b) Rupavali, 2nd part, by Nandalal Bose (Chuckerbutty, Chatterjee and Co.).
- (c) Indian Artistic Anatomy by Dr. A. N. Tagore, C.I.E. (published by the Indian Society of Oriental Art, Calcutta), (optional).

## APPENDIX E

### DUTIES OF THE CONTROLLER OF EXAMINATIONS

#### A. WORK PRECEDING THE EXAMINATIONS

##### *I. Work in connection with dates of Examinations.*

- (i) Fixing of dates.
- (ii) Printing of date-sheets.
- (iii) Issuing and publication of date-sheets.

##### *II. Work in connection with the ascertainment of probable candidates under each subject.*

- (i) Preparation of circular letters to Heads of Institutions, asking for the requisite figures.
- (ii) Printing of circular letters.
- (iii) Issuing of circular letters.
- (iv) Collection of figures from replies received.

##### *III. Work in connection with question-papers.*

- (i) Appointment of Paper-setters.
- (ii) Printing of forms of appointment letters, rules, forms of question papers (original and duplicate), and double (inner and outer) envelopes.
- (iii) Appointment of question-papers.
- (iv) Writing out of appointment letters.
- (v) Issuing of appointment letters with enclosures.
- (vi) Arrangements for printing question-papers.
- (vii) Arrangements for packing and despatching question-papers.

##### *IV. Work in connection with the appointment of Examiners.*

1.
  - (i) Preparation of circular letters with forms, inviting recommendations from Fellows and Heads of Institutions.
  - (ii) Printing circular letters with forms.
  - (iii) Issuing of circular letters with forms.
2.
  - (i) Compilation of lists of Examiners recommended, and candidates for examinership.
  - (ii) Printing of lists of Examiners recommended, and candidates for examinership.
  - (iii) Circulation of lists to the members of the Boards of Studies, with notices for meetings.
3. Preparation of comparative statement of Examiners.
4.
  - (i) Secretariate work in connection with the meetings of the Boards of Studies.
  - (ii) Drawing up of the Proceedings of the Board of Studies.
5.
  - (i) Appointment of Tabulators, Moderators and Examiners.
  - (ii) Printing of Forms of Appointment letters for Examiners.
  - (iii) Writing out of Appointment letters to Examiners, Tabulators and Moderators.
  - (iv) Issuing of Appointment letters to Examiners, Tabulators and Moderators.

*V. Work in connection with the supply of forms, etc., preliminary to Examinations.*

1. (i) Printing of application forms, Admission tickets (original and duplicate), blank answer-books, Logarithm tables, squared papers, Programmes of Examinations and Labels and Addresses for packets of question-papers.  
(ii) Issuing of application forms.
2. (i) Printing of letters to Superintendents, Rules for Examinations and Rules for the guidance of candidates.  
(ii) Issuing of letters, Rules, Log-tables, answer-books, squared papers, and programmes to Superintendents of centres.

*VI. Work in connection with cases of change of centres.  
Correspondence.*

*VII. Work in connection with the theses presented by candidates for Degree Examinations.*

- (i) Circulation of theses to Examiners.
- (ii) Communication of results to candidates.
- (iii) Publication of results in the Gazette.

*VIII. Work in connection with the receipts of application forms from candidates.*

1. (i) Receipt of applications.  
(ii) Scrutiny of applications.  
(iii) Assigning of Index numbers.
2. (i) Preparation of statements regarding question-papers required in each subject in each centre.  
(ii) Preparation of envelopes for sending out question-papers.
3. (i) Preparation of statements regarding the printing of Roll Cards.  
(ii) Printing of Roll Cards.  
(iii) Issuing of Roll Cards.
4. (i) Preparation of Rolls.  
(ii) Printing of Rolls.  
(iii) Issuing of Roll sheets to different centres.
5. (i) Writing out of Admission Tickets (original and duplicate).  
(ii) Despatch of Admission Tickets.  
(iii) Keeping of records of the despatch of Admission Tickets.

*IX. Arrangement work in connection with the holding of Examinations at Calcutta Centre.*

1. Correspondence on the subject of loan of examination halls.
2. (i) Preparation of statements regarding allotment of candidates to different centres.  
(ii) Printing of statements regarding allotment of candidates.  
(iii) Issuing of statements regarding allotment of candidates.
3. (i) Preparation of detailed plan of seats.  
(ii) Arrangement of furniture, etc.  
(iii) Assortment of Roll Cards.
4. Supervision work at the University Buildings Centres.
5. Carrying of question-papers to different Calcutta Centres.

## B. WORK DURING AND AFTER THE EXAMINATIONS

I. *Work in connection with the distribution of answer-papers.*

1. Preparation of statements of apportionment of answer-papers.
2. (i) Collection of answer-papers from different Centres.  
(ii) Despatch of answer-books to Examiners.  
(iii) Receipt of answer-papers from Examiners.  
(iv) Despatch of answer-papers to Head Examiners.
3. (i) Fixing of the latest dates for submission of marks.  
(ii) Printing of Notices regarding the latest dates for submission of marks.
4. (i) Apportionment of Slip Rolls for entering marks.  
(ii) Issuing of Slip Rolls, rules, question-papers and notices regarding last date for submission of marks to Examiners.

II. *Work in connection with Practical Examinations.*

1. (i) Fixing of dates of Practical Examinations.  
(ii) Printing of date sheets.  
(iii) Issuing of date sheets.
2. (i) Fixing of Centres for Practical Examinations.  
(ii) Printing of Notices for Practical Examinations.  
(iii) Issuing of Notices for Practical Examinations.
3. Returning Note-books submitted by candidates in connection with the Practical Examinations.

III. *Work in connection with the preliminary meetings of Examiners.*

1. (i) Preparation of Notices of meetings.  
(ii) Issuing of Notices of meetings.
2. (i) Printing or typing of Rules for marking determined by Examiners.  
(ii) Issuing of Rules for marking to individual Examiners.

IV. *Work in connection with receipt of marks.*

1. (i) Receipt of marks from Examiners.  
(ii) Issuing of marks to Tabulators.
2. (i) Preparation of re-examination slips.  
(ii) Sorting of answer-papers for purposes of re-examination.  
(iii) Issuing of re-examination slips and answer-papers to be re-examined.  
(iv) Receipt of re-examination marks.  
(v) Issuing of re-examination marks to Tabulators.

V. *Work in connection with the reporting of Examination results.*

1. (i) Preparation of Notices for meetings of Moderators and Examiners.  
(ii) Issuing of Notice of meetings.
2. Dealing with the reports of Superintendents of Examinations.
3. Preparation of the skeletons of the reports of Examiners.

*VI. Work in connection with the publication of results.*

1.
  - (i) Checking of the Office copies of Rolls.
  - (ii) Drawing up of the lists of absentees.
  - (iii) Writing out of names of Institutions against names of candidates in the Rolls.
2.
  - (i) Preparation of the lists of successful candidates (a) for sale, (b) for publication in the office, and (c) of publication in the Gazette.
  - (ii) Arrangement of the lists of successful candidates in alphabetical order as also in order of merit.
  - (iii) Checking of the lists of successful candidates.
  - (iv) Arrangements for publication of the lists of successful candidates in the Assam and Calcutta Gazettes.
3.
  - (i) Preparation of errata.
  - (ii) Publication of errata in the Gazette.

*VII. Work in connection with the results after their publication.*

1.
  - (i) Printing of forms of mark-statements and crossed lists, and of certificates and Diplomas (original, duplicate and provisional), and of special certificates.
  - (ii) Writing and signing of the above.
  - (iii) Issuing of the above.
  - (iv) Keeping records of issuing.
2.
  - (i) Preparation of crossed lists for different Institutions.
  - (ii) Issuing of crossed lists.
  - (iii) Keeping records of issuing.
3. Correspondence work regarding order of merit.
4. Drawing up of lists for the award of prizes, medals and scholarships.
5. Preparation of the lists of "Bad Schools."
6. Dealing with the reports of Examiners

*VIII. Work in connection with scrutiny.*

1.
  - (i) Collection of answer-papers examined.
  - (ii) Arrangement of answer-papers for purposes of scrutiny.
2. Drawing up of the lists of applicants for scrutiny.
3.
  - (i) Preparation of covering letters to scrutinisers.
  - (ii) Issuing of covering letters with answer-papers to scrutinisers.
  - (iii) Receipts of Reports of scrutiny.
  - (iv) Communication of results of scrutiny.

*IX. Work in connection with statistical information.*

1.
  - (i) Preparation of statements as required by the Education Departments of Government.
  - (ii) Issuing of statement.
2. Preparation of tabular statement.
3. Compilation of statements for the Annual Report of the Syndicate.

*X. Publication of Calendar.*

1. Printing of Examination papers in volume form.
2. Printing of Class and Pass lists in volume form.

## APPENDIX F

### FURTHER CHANGES IN THE REGULATIONS

(SANCTIONED BY GOVERNMENT SINCE THE PRINTING OFF  
OF THE MAIN BODY OF THE REGULATIONS)

The following changes were made in Chapters XI and XXXIII of the Regulations :—

#### CHAPTER XI

(1) In Section 7 the words '(vi) Modern Indian Language' be replaced by the words '(vi) Bengali' and the following words be inserted thereafter :—

'(vi-a) Modern Indian Language (other than Bengali).'

(2) The following proviso be added at the end of the proviso—' Provided that.....Committee' in Section 8 :—

' Provided that the Board of Higher Studies in Bengali shall consist of at least three members from the Board of Higher Studies in Modern Indian Language (other than Bengali) and *vice versa*.'

#### CHAPTER XXXIII

I. In Section 5 the words '(x) Modern Indian Language' be replaced by the following :—

(x) Bengali

(x-a) Modern Indian Language (other than Bengali)

II. In Section 8 the heading 'Modern Indian Language' and the syllabuses thereunder in Bengali, Assamese, Oriya, Hindi and Urdu be replaced by the following :—

#### *Bengali*

Paper I—History of Literature .. .. . 100 marks

(General knowledge of the social and political history of Bengal having a bearing on the development of the Bengali Literature will be also required.)

Paper II—Middle Indo-Aryan and Apabhramsa Texts 50 }  
History of Bengali Language 50 } 100 marks

(Besides the study of the prescribed texts candidates will be expected to possess a fair knowledge of the Grammar of the Middle Indo-Aryan Languages.)

Paper III—Old and Mediaeval Bengali Texts .. .. . 100 marks

Paper IV—Modern Poetry Texts .. .. . 100 marks

Paper V—Modern Prose Texts 50 }  
Drama Texts 50 } 100 marks

Paper VI—A Special Period of Modern Bengali Literature 100 marks

Paper VII—Special study of one of the following topics to be selected by the candidate :— 100 marks

- (i) Vaishnava Literature
- (ii) Mangal Kavyas
- (iii) Novels and Short Stories
- (iv) Modern Lyrical Poetry
- (v) Modern Narrative and Epic Poetry
- (vi) Drama
- (vii) Folk Literature
- (viii) Comparative Literature

Paper VIII—Principles of Literary Critics 50  
 Essay 50 100 marks

(The essay to be composed must be in Bengali.)

*N.B.*—In respect of the topics mentioned in Paper VII, the Executive Committee of the Post-Graduate Council in Arts, on the recommendation of the Board of Higher Studies in Bengali will specify from time to time those on which papers will be set and teaching provision made in any particular year.

The scope of subject included in each paper shall be defined and suitable text-books and periods of literature recommended from time to time by the Board of Higher Studies in Bengali.

## MODERN INDIAN LANGUAGE (OTHER THAN BENGALI)

### A. —ONE LANGUAGE COURSE

- (1) Hindi
- (2) Urdu

#### *Hindi*

Paper I—History of Literature .. .. 100 marks

(General knowledge of the Social and Political History of India having a bearing on the development of the Hindi Literature will also be required.)

Paper II—Early Hindi Texts (up to 1400) .. 100 marks

History of Hindi Language (including a Selection of Middle Indo-Aryan and Apabhramsa Texts—Besides the study of the prescribed text candidates will be expected to possess a fair knowledge of the grammar of Middle Indo-Aryan Language).

Paper III—Mediaeval Hindi Texts (up to 1800) .. 100 marks

Paper IV—Modern Poetry Texts (from after 1800 to the present day). 100 marks

Paper V—Modern Prose Texts 50 }  
 Drama Texts 50 } 100 marks

Paper VI—A special period of Modern Hindi Literature 100 marks

Paper VII—Special study of one of the following topics to be selected by the candidate :—	100 marks
(i) Vaishnava Literature	
(ii) Folk Literature	
(iii) Novels and Short Stories	
(iv) Lyrical Poetry	
(v) Modern Narrative and Epic Poetry	
(vi) Study of a special poet or group of poets	
(vii) Comparative Literature	
Paper VIII—Principles of Literary Criticism ..	50
Essay (The Essay to be composed must be in Hindi).	50
	100 marks

## Urdu

Paper I—History of Literature (General Knowledge of the Social and Political History of India having a bearing on the development of the Urdu Literature will also be required).	100 marks
Paper II—Early Urdu Texts up to Wali ..	50
History of the Urdu Language ..	50
	100 marks
Paper III—Mediaeval Urdu Texts (up to the age of Meer) ..	100 marks
Paper IV—Modern Poetry Texts (up to date) ..	100 marks
Paper V—Modern Prose and Drama Texts ..	100 marks
Paper VI—A Special period of Modern Urdu Literature ..	100 marks
Paper VII—Special Study of one of the following topics to be selected by the candidate :—	100 marks
(i) Masnavi	
(ii) Quasida	
(iii) Novels and Stories	
(iv) Modern Narrative and Epic Poetry (including Mars'ya)	
(v) Ruba'i	
(vi) Comparative Literature	
(vii) Modern Hindi Texts	
Paper VIII—Principles of Literary Criticism ..	50
Essay (The Essay to be composed must be in Urdu).	50
	100 marks

N.B.—In respect of the topics mentioned in Paper VII, the Executive Committee of the Post-Graduate Council in Arts, on the recommendation of the Board of Higher Studies in Modern Indian Language will specify from time to time those on which papers will be set and teaching provision made in any particular year.

The scope of the subject included in each paper shall be defined and suitable text-books and period of literature recommended from time to time by the Board of Higher Studies in Modern Indian Language (other than Bengali).



## B.—COMBINED COURSE

(For the purpose of the M.A. Examination in this course candidates will not be allowed to offer a language in which they have already taken their M.A. Degree.)

Papers I and II—One of the following languages :—Bengali, Hindi, Oriya, Urdu, Assamese and such other languages as may be added from time to time to the list.	200 marks
Papers III and IV—Another language from the above list not selected for Papers I and II.	200 marks
Paper V—Sanskrit or Persian .. .. .	100 marks
Paper VI—Middle Indo-Aryan Texts .. .. .	100 marks
Paper VII—General History of Indo-Aryan Language ..	100 marks
Paper VIII—History of the Literature of the Languages selected for Papers I to IV.	100 marks

The scope of the subject included in each paper shall be defined and suitable Text-books recommended from time to time by the Board of Higher Studies in Modern Indian Language (other than Bengali).

III. The heading 'General' and the paragraphs thereunder be *deleted*.

## CHAPTER L-B

## (DIPLOMA IN INDUSTRIAL HEALTH)

(1) Section 1 was replaced by the following :—

"An examination for the Diploma in Industrial Health shall be held twice every year at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

The examination shall be divided into two parts—Part I and Part II, as defined below in Section 6."

(2) The last para. under Section 2 was replaced by the following :—

"Provided that a candidate who fails to appear at or pass the Part I Examination may appear in Parts I and II together on payment of the prescribed fee for each part but no credit will be given to Part II Examination unless and until he passes in Part I Examination."

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## APPENDIX G

SYLLABUSES AND COURSES OF STUDIES ADOPTED BY THE SYNDICATE ON THE RECOMMENDATION OF THE RELEVANT BOARDS OF STUDIES.

### CHAPTER XL

1. Add as (v) to the list under (F) on page 520 of the Regulations the following "Educationally Retarded Children."

2. Syllabus for the whole group coming under (F).

(1) A short description of various types of handicapped children.

(2) Definition and classification of retarded children of the type selected.

(3) Causes and diagnosis of retardation—physical, sensory, motor, intellectual, temperamental and moral.

(4) Organisation—School systems in different countries—residential and day schools; selection of pupils; size of classes; the qualifications of teachers; out of school organisation.

(5) Curricula of Teaching methods; Discipline.

(6) Specific training of retarded children; physical training; Hand-work; Drawing; object-lesson; speech; Reading; Spelling; Arithmetic; Moral, Social and aesthetic training.

The following syllabus in 'Arts and Crafts' under Contents and Methods of Teaching [Chapter XL, Section 7, item 4(x) of the Regulations], has been prescribed for the B.T. Examination with effect from the year 1952:—

(A) Aims of teaching Arts and Crafts—appreciation of beauty, development of creative power and ability in the arrangement of colour and form.

(B) Methods of teaching Arts and Crafts in Infant, Junior and Senior stages.

(C) Drawing—

(a) Representation—Drawing from observation and memory—Natural objects including human figure, fashioned objects.

(b) Imagination and invention—Pictorial illustrations, decorative inventions and applied designs, geometrical drawings in association with designs and lettering, idea of perfection.

(D) Modelling and Craft work—

Clay modelling—Study of objects in roundness, high relief, low relief, use of plasticine in modelling, casting and moulding (plaster of parts).

Card-board modelling—Use of leather in fashioned objects—Batik work on leather, use of colour and mediums in leather craft.

Paper work—Decorative inventions with coloured papers: pattern; designs, papier mache.

Pottery decorations—Use of pigments, mediums used, composition. Spinning and toy-making.

Block-making and method of printing pictures in the class-room, Line-cut, Stencil-making.

Painting—choice of pigments, use of different mediums. A study of the characteristics of some important types of paintings of different schools—Primitive Buddhist, Hindu, Muslim, Western and Modern Paintings.